Let Municipal Improvements Go Forward!
(See page 5)

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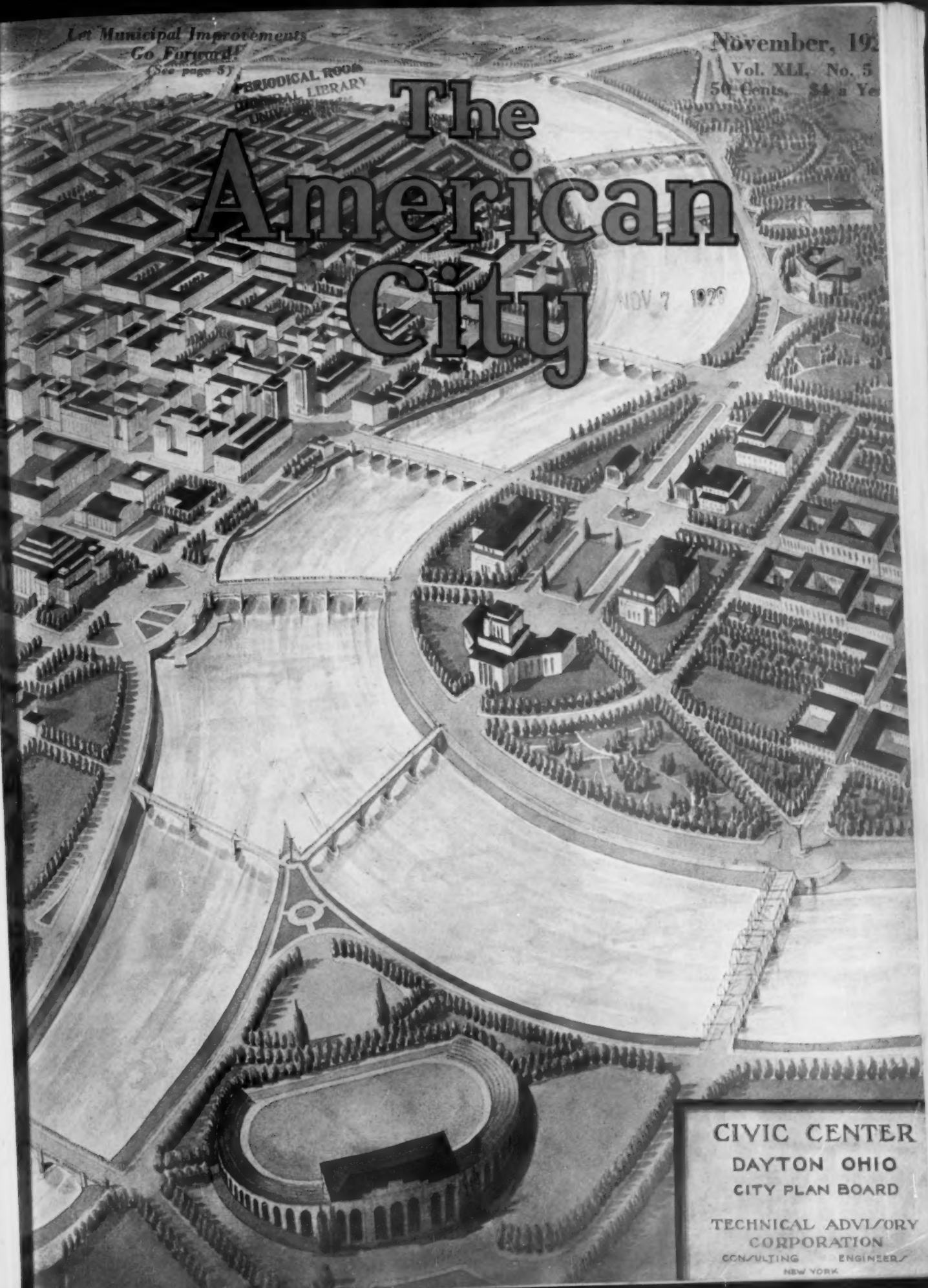

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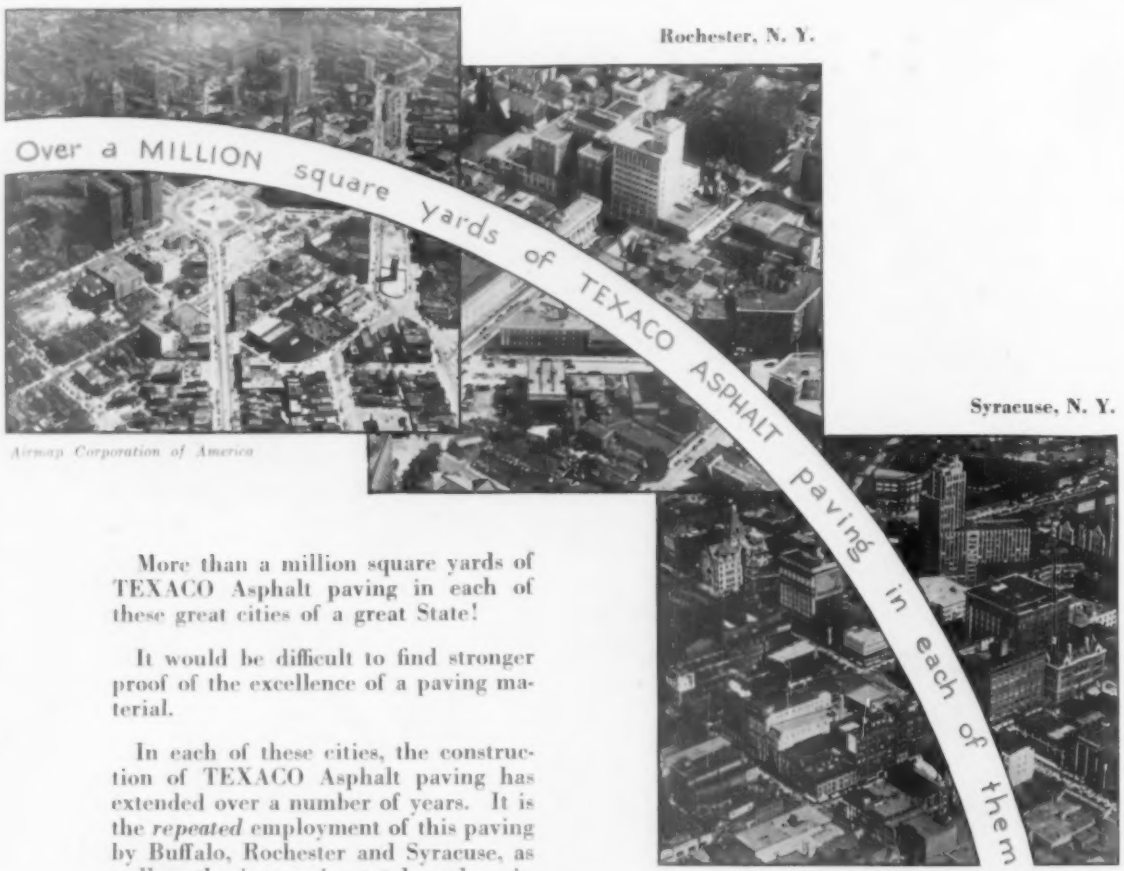

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In addition to what is published in THE AMERICAN CITY, other material, including articles, lists and bibliographies on a wide variety of municipal and civic subjects, appears each year in

The Municipal Index

Edition of 1929, 786 pages

Index to CONTENTS, November, 1929

Accident Prevention
Making the Most of Accident Records.. 99
What May Happen on a Windy Day.... 133
Stop Children from Begging Rides..... 147

Airports and Aviation
Making the Airport Accessible to the City 5
Three Outstanding European Airports.. 85
Recommended Regulation of Aircraft.. 124

Beautification
Highway Beautification, Massachusetts.. 96
Planting a Million Tulip Bulbs..... 132

Buildings
The Cincinnati Department of Buildings 125
Memorial Municipal Building, Hinsdale 146
Municipal Building, Ventnor, N. J..... 148

City Planning and Zoning
Dayton's River-Front Civic Center.... 94
Advantages of the Smaller City..... 121
A Model Town on World's Largest Artificial Lake 126
The Calf-Path 128
Spaciousness in the City Plan..... 129
Radburn's Unique Plan Shows Results.. 142
Memorial Plaza, St. Louis..... 134
Layout of Cross Roads, Junctions and Corners 151
Professor Hubbard Heads School's Regional Planning Department..... 158
Zoning and Planning Notes..... 171

Civic and Commercial Organizations and Their Work
Prize-Winning Ideas, NACOS Convention 19
Will That Industry Really Benefit Your City? 119
Business Directory, Napa, Calif..... 134

Condemnation of Land
National Standards for Appraisers.... 96

Conventions 5, 181

Engineering, County, Who's Who in..... 13

Finance
The Municipal Bond Market..... 17
The Taxpayer's Dollar..... 165

Fire Prevention and Control
Record-Breaking Fire-Rate Reduction... 19
Annual Saving of Over $100,000 Taxes 19
First-Aid Work for Cincinnati Firemen. 21
Part-Paid Fire Departments..... 21
Who's Who in Public Safety..... 21
Civic Spirit Down Cellar..... 97
A Monthly Open Letter..... 111
Equipment and Personnel of Municipal Fire Departments in Relation to Population 137
Repair-Pit, San Francisco Fire House.. 147
Farmers Buy Rural Fire Apparatus.... 148
Equipment of Village Fire Departments —Part II 157
Fighting Airplane Fires..... 185

Forward Steps 145

Gasoline Stations Architectural Assets... 98

Grade-Crossing Safety
Teaching Safety in the Schools..... 135
Solving Problem by Cooperation..... 146

Health and Sanitations
Teaching Health in the Schools..... 135
Health Department Laboratory, Pasadena 135
The Month in Public Health..... 162

Legal Decisions 173

Lighting
Through the Dark Ages of Street Lighting 108

Monthly Open Letter..... 111

News and Illustrations..... 185

Parks and Recreation
Paragraphs from the Recreation Congress 15
Garment Workers at Noon Hour..... 132
Elephants in Playground Circus..... 133
Greek Theater with Modern Improvements 145
Artificial Lake, Mitchell, S. Dak..... 148
A New Playground Swing..... 189

Pictures and Paragraphs..... 132

Police and Prisons
Police Training Schools, N. Y. State.. 21
Who's Who in Public Safety..... 21

Power-Plants
Diesel-Engine Pumping Equipment..... 159

Prequalification of Bidders
In Philadelphia 17
Necessary and Constitutional?..... 150

Public Works
Let Municipal Improvements Go Forward! 5

Publications 177

Sewers and Sewage Treatment
50-Year-Old Pipe Unearthed..... 7
San Antonio Sewage Treatment Plant.. 7
Pulverizing Sewage Screenings..... 8
Sewer Program Will Permit Stifled City Growth to Become Normal..... 122
Floating Cover for Sludge Digestion Tanks 191

Skyscrapers
Cuneo Tower Permit, Chicago, Ordered Revoked 5
Assets or Liabilities?..... 95

Snow Removal
Tackling the Snow Problem in Cities.. 101
From Highways and City Streets..... 183
Complete Snow Removal..... 189
Rotary Snow Shovel for Heavy Trucks. 191

Streets and Highways
Contract Work and Day Labor, N. Y.. 11
New Road-Surfacing Material..... 11
Maintenance Costs, Bituminous Concrete, Fresno County, Calif..... 11
Ice Underfoot and Overhead..... 11
States Improved 29,252 Miles in 1928. 11
Taking Away the Trolley Tracks..... 107
Cooperation Breaks a Rocky Barrier.. 117
Black Base Pavement Used in Construction 118
Vitrified Brick Pavement..... 140
Bumps and Holes Eliminated, Glens Falls 141

Tourist Information 135, 149

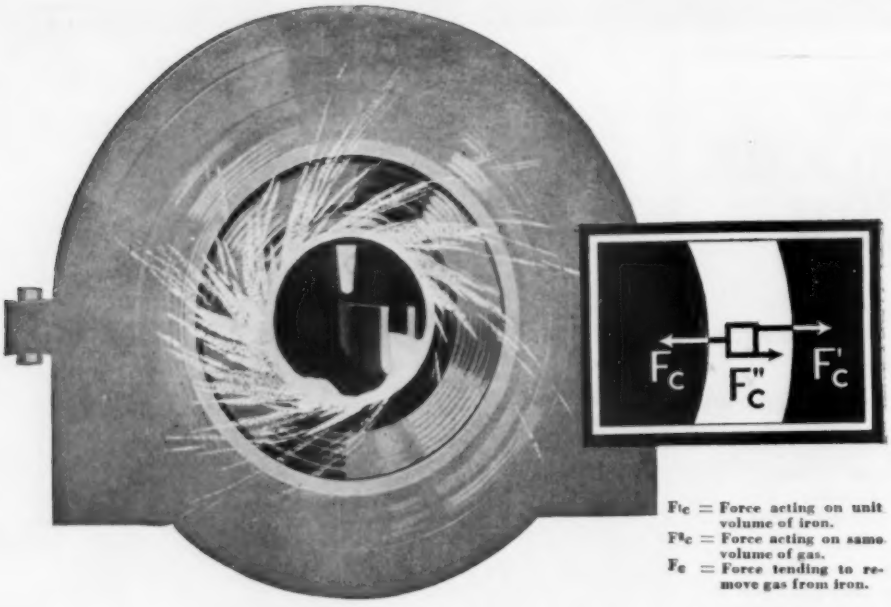
Traffic and Transportation
Billion-Dollar Program, New York..... 5
Chicago's "No Parking" Regulations.. 17
Wisconsin Traffic Ordinance..... 17
Highway Sidewalks Urged by A. S. M. I. 21
Massachusetts Official Traffic Code.... 90
Committees, National Conference on Street and Highway Safety..... 93
Automobile Parking Machine..... 100
Methods of Impounding Automobiles.. 144
Underground Pedestrian Concourse, Philadelphia 146
Mechanical Bluecoat, Wilmington, Del. 149
Financial Responsibility Law, New Jersey 163
Street Widening and Traffic Flow..... 169
Moving Traffic Obstruction, Philadelphia 189

Waste Collection and Disposal
$30,000 Saved from the Garbage Can.. 103

Water-Supply and Water-Works
Employees Uniformed 7
Montreal's Per-Capita Consumption.... 7
Who's Who in Water Supply..... 9
Thawing Out Winter Water-Works Problems 97
Building a Dam on Pike's Peak..... 107
Survey of Water-Meter Rates—VI..... 112
Hydrant Rentals, Sprinkler Charges, III 136
Water-Main Cleaning Unearths Antique 139
Regulations, Taps and Services, III... 165
New Cast Iron Pipe Lining..... 185
New Journal for Water-Supply People.. 185
Copper Water-Service Installation..... 187

Who's Who 9, 13, 23

For Index to Advertisements see page preceding back cover



F_{1c} = Force acting on unit volume of iron.
F^1_c = Force acting on same volume of gas.
F_c = Force tending to remove gas from iron.

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A Billion-Dollar Program for Untangling and Facilitating New York's Traffic

A BILLION-DOLLAR traffic plan for New York City, based upon a survey of present conditions and involving the construction of vehicular tunnels, bridges, through and marginal highways, and street widening and extensions necessary to relieve existing congestion and meet the demands of the city's development for the next twenty years, was submitted on October 24 to the Board of Estimate and Apportionment and referred by it to the Committee of the Whole. The survey and plan have been made by Day and Zimmerman, Inc., traffic and transportation engineers of Philadelphia, retained by the city nearly a year ago at the behest of Mayor James J. Walker.

The first reaction of municipal and civic officials and organizations to the plan was one of commendation, with some reservations as to certain of the most drastic proposals, and with recognition in every quarter of the necessity of making careful studies of the program in all its details. Some of the important recommendations, it is noted, are in line with previous recommendations by the Port of New York Authority, Regional Plan Committee and other official or civic bodies.

Chicago City Council Orders Cuneo Tower Permit Revoked

THE amazing attempt to make "The sky the limit" in Chicago, described in THE AMERICAN CITY for August (page 150) has been defeated by an aroused public opinion. Under an amendment to the zoning ordinance quietly adopted on June 14, a permit had been granted on July 8 for a 60-story building which was to be known as the Cuneo Tower, and which would have risen to a height of 440 feet on Michigan Avenue without setback, with a 217-foot tower surmounting the main structure.

So strong was the opposition to this attempt to make congestion worse confounded in the Chicago Loop, that the City Council, on October 2, instructed the Commissioner of Buildings to revoke the Cuneo permit. This was followed on October 17 by the repeal of the ordinance of June 14, under which the Cuneo permit had been granted.

The tendency toward needlessly high buildings in Chicago was given a further check on October 22 by a decision of the Illinois Supreme Court, which indicates that many of the existing office and apartment buildings are of illegal height. This decision affected a 20-story apartment building, 231 feet high, now standing at 40 East Oak Street. As reported in The *Chicago Tribune* of October 23, a permit for this structure had been authorized by the Zoning Board, although the legal limit in that location was 90 feet; and two property owners having appealed from this action, Justice Dunn, of the Supreme Court, upheld their contention that the Zoning Board had no power to order the Building Commissioner to grant the permit in question.

Items and Abstracts *for* MAYORS AND CITY MANAGERS

Let Municipal Improvements Go Forward!

The American people are facing a crisis which demands clear thinking and prompt action by all who spend, or advise in the spending of, public funds. A time of speculative setback is no time for curtailment of public works. On the contrary, a wise increase in such activities may prove to be the stabilizing force now needed to prevent too violent a rocking of the industrial boat.

During recent months municipal bond offerings have been curtailed because of the diversion of enormous sums of private capital to the allurement of stock speculation. For millions of investors, large and small, that allurement has now vanished. With it may vanish some of the inflated purchasing power which has helped to turn the industrial propeller. If our governmental bodies—local, state, and national—will now prepare to go forward with a vigorous and courageous program of needed improvements, they should soon be able to sell their bonds and award contracts at less cost than has recently been possible.

American prosperity will recover from its present shock, not by foolish hoarding and loafing, but by wise spending and building. The Dayton civic center and river improvement plan, illustrated on the front cover of this issue, and described on pages 94-95, is an excellent example of a municipal project conceived in the grand manner. Not to halt, but to carry forward with renewed vigor, such public improvements as this, is the opportunity and obligation of municipalities today.

Making the Airport Accessible to the City

"TIME is the most valuable article aviation has to offer, and, as we all know, it is a highly perishable commodity," said the Assistant Secretary of War, F. Trubee Davison, in an address before the Airport Conference held under the auspices of the American Road Builders' Association and the Aeronautical Chamber of Commerce, in Washington, October 24-25.

One of the chief criticisms that may be directed against municipal airport conditions is the failure of many localities to give serious thought to transportation facilities from the city to the airport, Mr. Davison said. The importance of planning for the future was also strongly stressed:

"Because of the speed with which the picture changes, it would be fallacious to fashion airports after a too rigid pattern based on aviation as we know it today. Imagination and visualization must be component parts of any airport project. Those who plan landing facilities should look beyond the present and conjure a picture of what air needs will be, not in 1929, but in 1939 or even in 1950.

"It has often been said that in aviation of today we are fundamentally building for the future. Nothing could be truer with respect to airports. It therefore evolves upon those charged with the duty of furnishing landing facilities for any particular community to see to it that adequate room is reserved for expansion. This is not always easy to do. After all, the question of cost is a factor, and the more land set aside for airport use, the greater the expense to the municipality that owns it."

Through the courtesy of Clarence M. Young, newly appointed Assistant Secretary of Commerce for Aeronautics, who furnished THE AMERICAN CITY an advance copy of his address at the above-mentioned Airports Conference, Major Young's paper is published as the leading article in this issue (pages 85 to 89).

Convention Season Still Flourishing

FOLLOWING the many conventions of municipal and civic interest that took place in October, the current month opens with another ample list (see page 181). Among those of outstanding interest to mayors and city managers are:

The National Municipal League, meeting at Hotel Stevens, in Chicago, November 12-14, with the Governmental Research Association, has its usual full program of important topics relating to municipal government covered in general or group sessions.

The International City Managers' Association, meeting in Fort Worth, Texas, November 20-23, will hold interest for mayors and councilmen as well as city managers, a special round-table session having been planned for them.

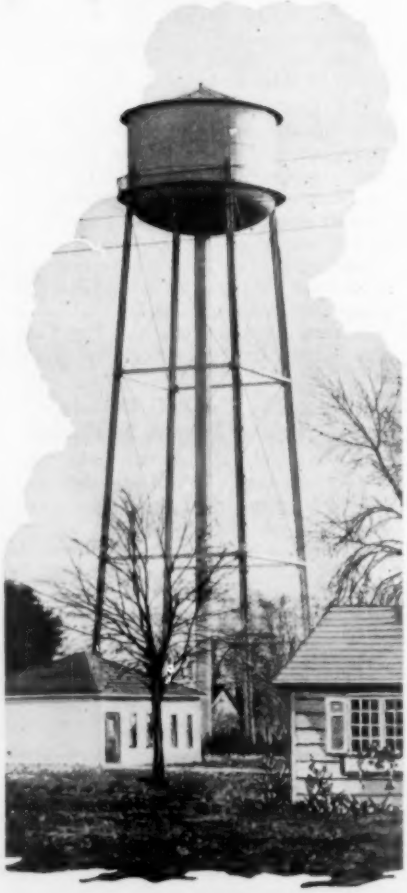
The Public Ownership League of America, meeting at Muscle Shoals, Ala., November 20-23, will present a rich and varied program on the public ownership situation, both national and municipal.

"I move to table the ordinance for re-laying water mains"

Changes in distributing mains are expensive . . . torn-up streets are a public annoyance . . . but people are complaining about the water service. How can ample volume at uniform pressure be assured?

Many municipalities have solved this problem—literally tabling ordinances for re-laying mains—with Horton elevated storage. By this means, many years of satisfactory life are added to the existing underground system. Mains work 24 hours a day, instead of 12 to 18, since the tank is filled when demand is low for use during peak loads. Fluctuations in pressure are cut down, giving better service with lower pumping costs.

The advantages of Horton elevated storage have been applied to small and large cities alike. Let us put you in touch with cities now using gravity water supplies. Our nearest office will also be glad to give you quotation on tanks to meet your requirements.



Whatever the size of your town, there is a Horton tank to fit its requirements. The illustrations show (left) a 500,000-gallon tank in Seattle, Washington and a 100,000-gallon tank in Benton, Ill.

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Boston	1501 Consolidated Gas Bldg
Dallas	3306 Magnolia Bldg.
Atlanta	1014 Healey Bldg.
San Francisco	1033 Rialto Bldg.
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Water-Works Employees Uniformed

ALL employees of the Hackensack Water Co., Hackensack, N. J., whose duties require them to enter homes of consumers will be uniformed, according to an announcement of Nicholas S. Hill, Jr., President of the company.

Inspectors, meter readers and collectors will be attired in dark gray whipcord with the insignia "H.W.C." in red on the right breast and will wear caps bearing the letters "H.W.C." also in red. The purpose of the uniforms is to enable customers to identify water company employees and to guard against unwarranted intrusion of homes by imposters who, in the past, have not infrequently posed as representatives of the company.

50-Year-Old Sewer Pipe Unearthed

RARELY is an opportunity afforded to the city engineer or inspector to obtain authentic data regarding the life of construction materials, principally because it is unusual for municipalities and others to keep a careful record of installations and construction.

Recently, in connection with repairs being made at a house in Raleigh, N. C., a clay pipe of unusual design and diameter was discovered. Investigation by John D. Thiem, plumbing inspector, of Raleigh, indicates that the 2-inch clay pipe, 36 inches long, was installed as a lavatory waste and connected to the 6-inch vitrified clay house sewer. The pipe which was uncovered was laid in 1873 and was therefore 56 years old when removed. The pipe was manufactured in Philadelphia by the Philadelphia Terra Cotta Works. Careful examination of the pipe showed that it was made of clay but not vitrified. The wall thickness is approximately 13/16-inch and the depth of the bell is 2 inches. The bell was apparently hand-molded to the pipe. In present-day manufacture, the bells on sewer pipes are formed with the pipe during the fabrication of the pipe. The glaze of this old pipe is in perfect condition and there are no signs or indications of deterioration either of the pipe or of the glaze.

Montreal Consumes 117.31 Gallons of Water Per Capita Daily

ACCORDING to the 1928 report of the Water Department of Montreal, there were 827 miles of water-mains in operation through which an average of 113,691,000 gallons of water were pumped a day at a cost of $918,037. The estimated population furnished with water is 951,000, giving a per capita daily consumption of 117.31 gallons.

During 1928, the Aqueduct Department placed 530 new valves, 181 hydrants and 2,700 new water services, bringing the total to 162,901 services. There are 5,537 hydrants in the system.

All water furnished by the city is now filtered. In 1928, the pumps at the low-level station furnished 33,061,440,000 gallons of filtered water at the Atwater station; 8,336,936,000 gallons was filtered at the Charlevoix station and 219,514,000 at Cartierville.

Items and Abstracts *on* WATER AND SEWERAGE

Two new filtering galleries were placed in operation at the Atwater plant during 1928. The 48-inch main from the Atwater station to Sherbrooke Street was completed during the year and had the beneficial effect of increasing the pressure in the district. A new 30-inch main was completed on Sherbrooke Street, which increased the East End supply considerably.

Unusual Features of the San Antonio Sewage Treatment Plant

PRELIMINARY to designing the new activated sludge plant at San Antonio, sewage measurements were carried on for a period of ten months. These measurements were made on a section of concrete flume through which the sewage flowed to Mitchell's Lake, an artificial lake ten miles south of San Antonio, the waters of which were used for irrigating approximately 4,000 acres of land. The average flow for ten months was 16,400,000 gallons per day, with a maximum flow of 28,400,000 gallons per day.

The present population of San Antonio is estimated at 285,000, of whom probably 220,000 contribute to the load of the sewerage system. The sewerage flow is at present 16,400,000 gallons daily. The new sewage treatment works is to be an activated sludge type of plant designed to handle 30,000,000 gallons of sewage per day, thus providing for an increase of approximately 85 per cent in the present sewage flow. The new plant will be located about five miles south of the city. The sewage will be conducted to the plant through a 76-inch concrete outfall sewer. The total flow will be measured by means of a 60 x 36-inch venturi meter, equipped with an automatic register-indicator-recorder.

There are to be two channels for the flow of sewage in the screen, in one of which will be installed a mechanical rotary screen with ½-inch openings between bars, and in the second channel a plain bar screen with openings of similar width. The incinerator in the screen house will utilize the gas from the digestion tanks as fuel. As the sewage goes to the grit chambers, its velocity is reduced to approximately one foot per second in order to promote sedimentation. There are three channels in the grit chamber, two of which will suffice for passing the entire flow while the third is being cleaned.

Two square primary clarification tanks, which are next in line, have an average water depth of 11 feet. These are designed on a basis of 30-minute sedimentation periods with an expected removal of 42 per cent of suspended solids. Skimming devices and scum drains are to be installed at one corner of each tank. Next in line are the aeration tanks, which are 20 feet wide with a 15-foot depth of sewage. There are three rows of filtros plates along one side of each channel, the ratio of plate area to tank area being approximately 1 to 7. The sewage flows back and forth through three channels, giving a total length of aeration channel of about 450 feet.

The final clarifier tanks are 90 feet in diameter with a 15-foot water depth. They are designed for a two-hour sedimentation period figured on a basis of design flow plus 20 per cent return sludge for 1,600 gallons per square foot of tank area daily. There will be four sludge digestion tanks, each 75 feet in diameter and 25 feet deep. They will be equipped with Dorr stirrers and scum breakers. These tanks provide for a 45-day storage of sludge. Digested sludge will be pumped from the digestion tanks to the two sludge lagoons, each 200 x 200 feet in area.

The treated effluent from the plant will discharge into the present earth channel which carries the sewage to Mitchell's Lake. From this lake the water will flow into the Medina or the San Antonio River or may be used for irrigation.

The lump sum contract price for the construction of this plant was $654,000, exclusive of the equipment for the primary clarifier tanks, final clarifier tanks, sludge digester, mechanical screen and air-compressors, which were bought by the city for $150,000.

—From *Proceedings*, American Society of Civil Engineers, Vol. 55, No. 6, August, 1929.

Disposal of Sewage Screenings by Pulverizing

AT the Baltimore sewage works, one of the advantages that the grinding of screenings has over pressing and incinerating is that one relatively small and inexpensive piece of machinery can be used instead of more expensive and elaborate equipment. Every device that can be omitted satisfactorily at a sewage works is conducive to simplicity in operation. Less labor is actually required to grind the screenings than to press and incinerate them. The question of hauling, handling and providing storage space for coal is eliminated. There are no ashes and clinkers and the screenings need be out of the sewage only a short time before they are ground and returned.

According to the conclusions regarding this method, published in the *Proceedings* of the American Society of Civil Engineers, Volume 55, No. 7, September, 1929, the grinding of sewage screenings in a suitable pulverizer affords a means of disposing of them, where local conditions favor such a method. The process should offer no great difficulty, because many other materials of a considerably more abrasive and resistant nature have been successfully ground in manufacturing plants and similar establishments for a number of years.

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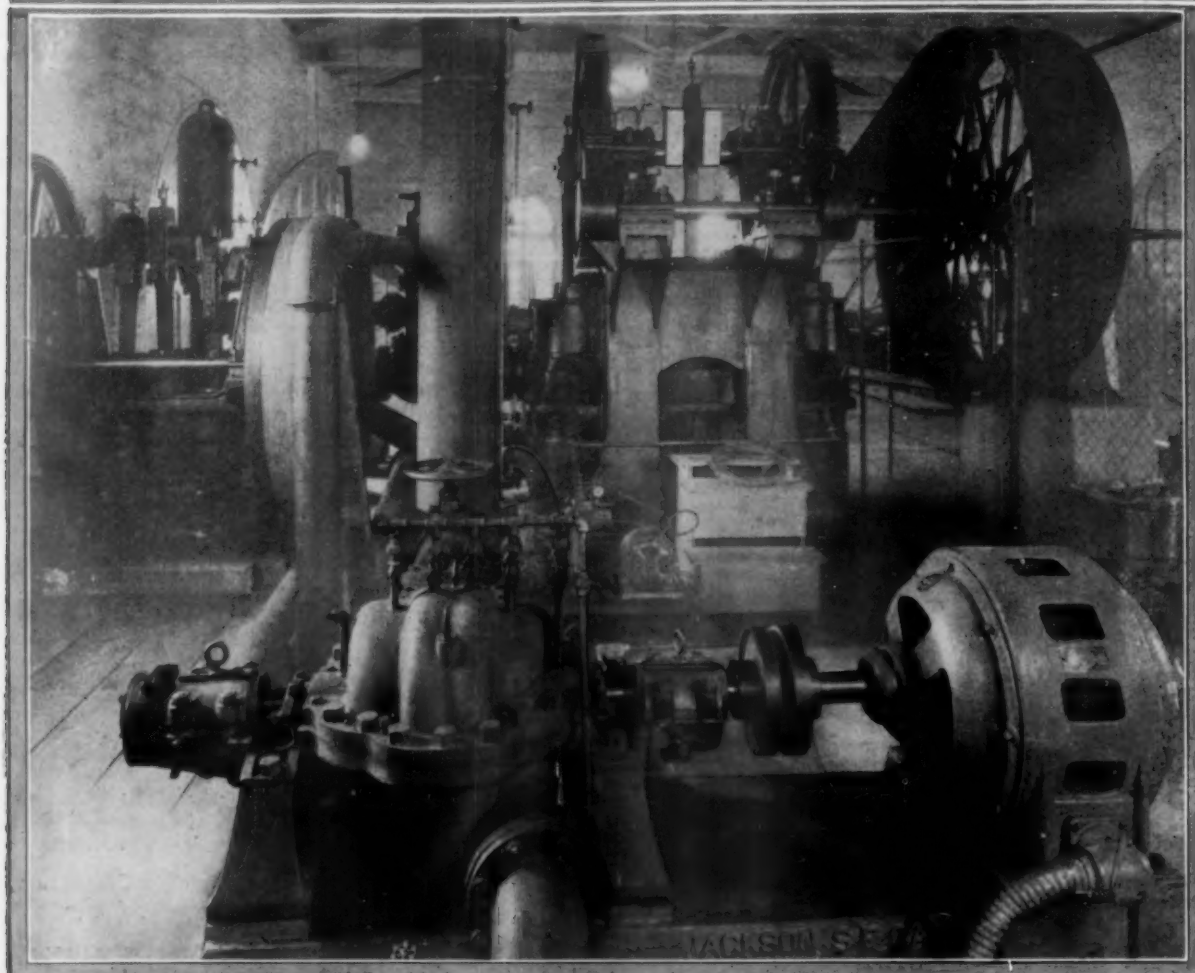

This picture tells its own story. The Byron Jackson Multiplex Pump in foreground was installed to do the work formerly performed by the large pumps in the background. The Byron Jackson centrifugal pump handles more water with its 100 h.p. motor than the two positive displacement pumps in the rear, belt-driven by two motors, one 100 h.p. and the other 30 h.p. Byron Jackson Multiplex Pumps save money on the power bill, require less floor space, are silent in operation and entirely reliable. Many engineers are now finding it profitable to replace their obsolete high pressure pumping equipment with these modern Multiplex Centrifugals.

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Supt., Water Works
Yonkers, N. Y.
(Appointed 1929)

CHARLES H. LORD
Supt., Water Works
Ogdensburg, N. Y.
(Appointed 1918)

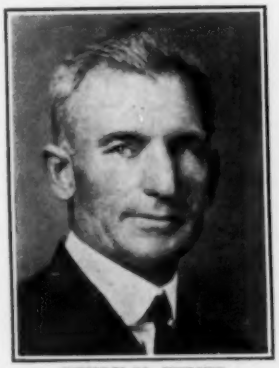
HENRY D. DARRON
Supt., Water Works
Kingston, N. Y.
(Appointed 1927)

JAMES BEDELL
Supt., Board of Water Commrs.
Ossining, N. Y.
(Appointed 1903)

WHO'S WHO IN WATER SUPPLY

Installment No. 23—Portraits of Water-Works Officials of 14 Cities in Six States

HOWARD E. WOLBERT
Supt., Board of Water Supply
Mt. Vernon, N. Y.
(Appointed 1922)



HENRY M. WHITE
Supt., Water Works
Oneida, N. Y.
(Appointed 1914)

THOMAS C. NORTH
Supt., Water Works
Blairsville, Pa.
(Appointed 1922)

PETER J. WINTGENS
Supt., Water Works
Ford City, Pa.
(Appointed 1912)

JAMES C. TURNER
Supt., Water Works
Tarentum, Pa.
(Appointed 1912)

HOMER KERR
Supt., Water Works
Gallipolis, Ohio
(Appointed 1928)

HORACE KNAPP
Water Supt.
LaGrande, Ore.
(Appointed 1921)

F. T. SCHULTZ
Supt., Light and Water
Columbia City, Ind.
(Appointed 1907)

EDWARD G. MORGAN, JR.
Supt., Public Works
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A. R. B. A.
ATLANTIC CITY N.J.
JAN. 13-18

TRUSCON PRODUCTS FOR REINFORCING ROADS AND PAVEMENTS

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Items and Abstracts for ENGINEERING AND HIGHWAY DEPARTMENTS

Contract Work and Day Labor in New York State Cities

A SURVEY of New York municipalities made by the New York State Bureau of Municipal Information shows that the prevailing practice in the construction of a municipal improvement is to have the work done by contract rather than by municipal forces. In the construction of pavements, sidewalks, curbs and gutters, and sewers, a large majority of the municipalities handle the work entirely by contract. In the construction of water-mains and for repair work on streets, most of the cities report the work done by municipal forces. In street grading, the cities are about equally divided in having the work done by contract and by force account.

In Jamestown and Salamanca all municipal improvement work is done by the city forces. In Cortlandt, Kingston and Oswego, all municipal improvement work except sidewalks is done by city employees. In Watertown, all this work is performed by city forces except for large paving and sidewalk jobs. In the five boroughs of New York City, all municipal improvements except repairs are done by contract. In Lockport and Utica, all this work except the laying of water-mains is handled by contract.

In 45 municipalities the paving and repaving of streets is done by contract, and in only 10 municipalities of those reporting is this work done by municipal forces. In 13 cities, the work is done partly by contract and partly by city forces, the smaller jobs being performed by day labor and the larger jobs being done by contract. The work of repairing pavements is done largely by city employees, 50 municipalities doing this work, while in 14 cities the work is done partly by contract and partly by municipal employees, depending upon the amount of work to be done. In only 4 municipalities is repair work done entirely by contract.

The construction of sidewalks is done by contract in 56 municipalities, by municipal forces in 5, and by both contractor and municipal forces in 7 cities.

The construction of curbs and gutters is done under contract in 49 cities, in 13 by municipal forces, and in 6 both by contract and by city labor.

In 36 cities the laying of water-mains is done by city labor, in 13 by contract, and 9 partly by contract and partly by city labor.

In the construction of sewers, 45 municipalities let this out by contract, 15 do it with day labor, and 8 by contract and by day labor.

The grading of streets appears to be done about equally by contract and by day labor, 27 cities doing the work by contract and 29 by city labor, while 12 cities have the work done partly by contract and partly by the city.

A New Road Surfacing Material

A NEW road material which is being used as a substitute for bitumen and which consists largely of petroleum oil shale is now being produced at a factory in South Melbourne, Victoria, where it is mixed with coal tar to produce a plastic material for binding and surfacing roads, according to a report of the United States Department of Commerce.

Because of the increasing importation of bitumen into Australia for road construction, the promotion of an Australian material of a similar nature which might be used as a substitute for surfacing is being watched with interest by municipal engineers.

A section of the new road compound was laid as an experiment in November, 1928, on a road in Melbourne, bearing heavy traffic. The surface is reported to have withstood the tests imposed upon it satisfactorily. Another experimental section only ⅛-inch thick was laid over a concrete road in Melbourne. It also supports heavy traffic and this test also is reported to have been successful. The process of manufacturing is patented.

Maintenance Costs for Bituminous Concrete Pavement in Fresno County, Calif.

DURING the years 1920 and 1921, Fresno County constructed 42.44 miles of Warrenite pavement on a flexible asphaltic base, totaling 5 inches in thickness. The average annual cost for pavement repair, exclusive of overhead, to July 1, 1928, was $9.63 per mile.

During the years 1921 to 1923, 122.22 miles of Fresno County Type-A pavement was constructed on a flexible asphaltic base totaling 5 inches in thickness. The average annual cost for pavement repair, exclusive of overhead, to July 1, 1928, has been $2.71 per mile.

In 1924, 24.84 miles of Fresno County Type A pavement was laid on a flexible asphaltic base 4 inches in thickness. The average annual cost for pavement repair, exclusive of overhead, to July 1, 1928, was $8.51 per mile.

Combining all of the pavement repair costs on the flexible base highways in Fresno County, with respect to age, it is found that $5 is the average annual cost per mile, exclusive of an overhead charge of approximately 25 per cent. Adding the overhead charge, the average annual cost for pavement repair would then be $6.25.

These flexible base pavements are carrying about 2,000 vehicles per day, and the pavements cost an average of $20,000 per mile, according to Chris P. Jensen, County Surveyor, Fresno County, Calif.

Ice Underfoot and Overhead

AN item under this heading in the Pennsylvania *Borough Bulletin* calls the attention of municipal officials to the necessity of avoiding damage suits by requiring pavements to be kept free from ice and snow. The municipality should see to it that the streets and sidewalks are in safe condition as far as they can be put in that condition by the use of due diligence.

Safety first should be applied in the building of sidewalks. All cement sidewalks should be roughened in such a manner as to insure the safety of pedestrians during the winter months. This can be done by the municipality if the owner refuses, providing a proper ordinance has been passed. It is advisable that an ordinance be framed to call for the roughening of cement sidewalks so that the owners of property and contractors will have due notice of the requirements. It is a simple matter and every owner of property should be willing to abide by the regulations.

Safety first should be applied to the construction of areaways, cellar doors, overhead signs and awnings. Iron plates on sidewalks should be roughened and should be examined and tested. The same applies to all cellar doors and areaways. This is the best season for the work to be done, for then repairs can be made before the worst weather of February begins.

Overhead signs and awnings are another source of danger and should receive consideration at this time of year. Wooden awnings and projecting eaves where snow and ice accumulate and may fall on pedestrians should receive close examination on the part of the municipal authorities, for, while the owner of the property may be liable, the municipality itself may also be liable and at any rate will have to incur large expenses in defending suits.

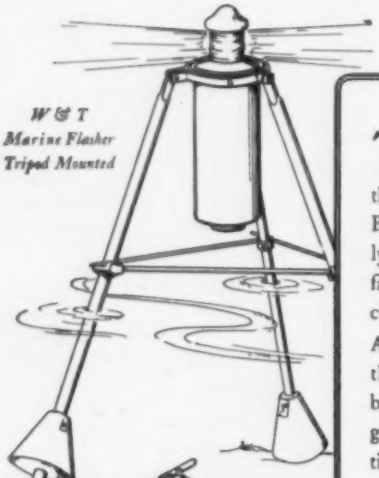
States Improved 29,252 Miles of Roads Last Year

ACCORDING to a recent report of the United States Bureau of Public Roads, during 1928 the 48 states improved a total of 29,252 miles of their highway systems, this being an increase of 2,530 miles over the 1927 figure of 26,722.

The 1928 total includes 8,675 miles of graded and drained roads and 20,577 miles of new surfacing. Of the roads surfaced, 13,843 miles were previously unsurfaced and 3,587 were previously improved with a type of surface lower than the one newly applied. The remaining 3,147 miles were previously improved with the same type of surface and the work done during the year is therefore classed as reconstruction.

The total of 20,577 miles of surfacing placed is classified by types as follows: 1,200 miles of sand-clay and top-soil; 9,623 miles of gravel; 1,006 miles of water-bound macadam; 1,979 miles of bituminous macadam; 225 miles of sheet asphalt; 373 miles of bituminous concrete; 6,055 miles of portland-cement concrete and 116 miles of brick and other block-type pavements.

FLASH! FLASH! FLASH!



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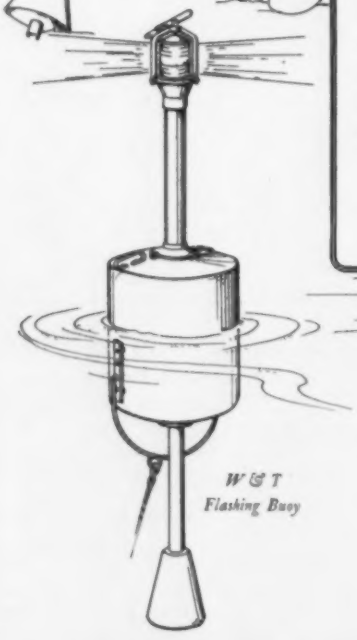
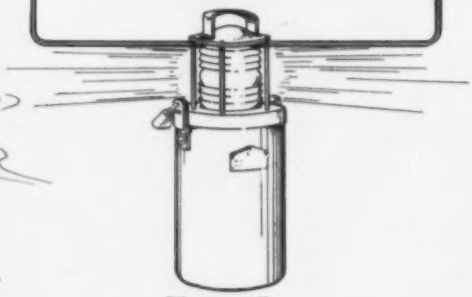


W & T Flashing Buoy



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County Surveyor, Boulder Co.
Boulder, Colo.
(Appointed 1920)

HENRY H. CURTIS
County Engr., Douglas Co.
Castle Rock, Colo.
(Appointed 1924)

H. W. GARDNER
County Surveyor, Jefferson Co.
Golden, Colo.
(Appointed 1926)

JOSEPH P. BACCA
County Engr., Las Animas Co.
Trinidad, Colo.
(Appointed 1928)

M. M. O'SHAUGHNESSY
County Engr., San Francisco Co.
San Francisco, Calif.
(Appointed 1912)

WHO'S WHO IN COUNTY ENGINEERING

Installment No. 9—Portraits of County Engineers and County Surveyors

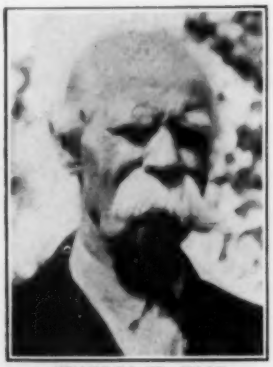
GEORGE E. HINE
County Surveyor, Otero Co.
La Junta, Colo.
(Appointed 1924)

T. W. SWITZER
County Surveyor, Tulare Co.
Visalia, Calif.
(Appointed 1929)

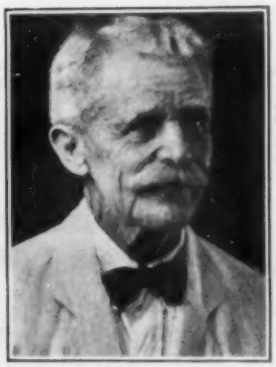
WILLIAM D. HOWARD
Road Supervisor, Luna Co.
Deming, N. Mex.
(Appointed 1928)

GEORGE H. RUSSELL
County Engr., Baca Co.
Springfield, Colo.
(Appointed 1927)

CHARLES A. GUERNSEY
County Surveyor, Phillips Co.
Holyoke, Colo.
(Appointed 1905)



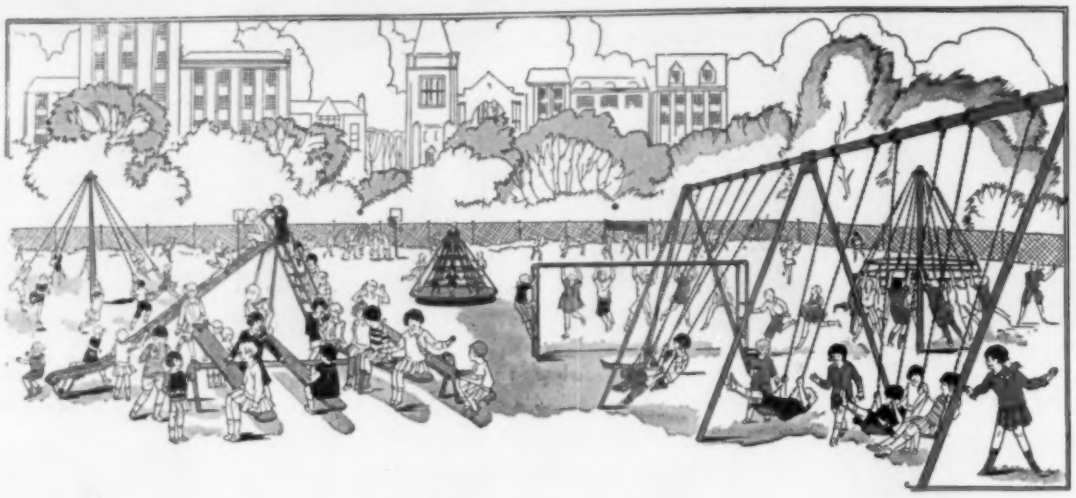
CHARLES W. POOR
County Surveyor, De Baca Co.
Fort Sumner, N. Mex.
(Appointed 1918)



SAMUEL A. JOYNER
County Engr., Comanche Co.
Lawton, Okla.
(Appointed 1923)

J. LESTER WHITE
Highway Engr., Morehouse
Parish, Bastrop, La.
(Appointed 1923)

M. F. VANCE
County Surveyor, Washington
Co., Akron, Ohio
(Appointed 1894)



More Playgrounds —Fewer Accidents

KEEP the children off the streets –give them good playgrounds with plenty of fun-making, muscle-building, health-developing equipment—and yours will be a town where accidents involving children are few and far between.

For 21 years, Everwear Playground Apparatus has been recognized as the standard of quality. Built to withstand the abuse of after-hours roughnecks. Embodies every element of safety human ingenuity can devise. Playable as though the kids themselves had planned it.

Schools, institutions, cities, — the country over which have equipped their parks and playgrounds with Everwear Equipment have found it superior. Also more economical, because of its greater durability.

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When you write for that catalog, kindly mention THE AMERICAN CITY.

"Letting Go" Gloriously Is the End and Aim of Leisure

COCKTAILS, scenic railways, cigarettes, and chewing-gum are the lower forms of "letting go." It is lucky that these lower releases exist, else the very young mentally might find their leisure unbearable. Letting oneself go is the end and aim of leisure. Chewing-gum makes you feel that you are doing something when you are not. Cigarettes, by speeding up certain glands, release us to do nothing with a sense of achievement. Cocktails kick us free of inhibitions by paralyzing certain brain controls. On the scenic railway, we let go of everything, including what the neighbor would say. The public recreation leader is a liberator who shows the people how to let themselves go gloriously.

OTTO T. MALLERY,
President, Playground Association of Philadelphia.

Education Through Recreation

EDUCATION for leisure has come to take its place alongside vocational education. We are coming to understand that fitness for work is just as dependent upon recreation as it is upon vocational skill. The boys and girls themselves are increasingly responsible for the control of their recreational program. We are actually returning to children the games they like to play as opposed to the doubtful practice of staging contests under the complete control and domination of adults. School children who have accepted responsibility for the production of a play, for the organization of sports in which all have participated, in the printing of a newspaper, in the development of a discussion group, in the organization of clubs interested in music, literature, science, the graphic arts, government, and the like, will be ready as adults to continue these activities.

GEORGE D. STRAYER,
Professor of Education, Columbia University, New York.

Nature Hike Leaders Needed

NEVER before in history has there been such an urge on the part of the city dwellers to get out into the country, to secure quiet and rest from the rush and noise of the urban environment and to breathe fresh air. Yet there are comparatively few who are qualified to conduct a group of persons on a nature hike. Leaders are needed who will point out things of interest along the way, not going too fast for the least active, yet setting a pace which will not be monotonous for the energetic, and reaching the goal at a given time. Lectures, moving pictures and exhibits are valuable in getting interest in hiking. If the appetite of the group has been sufficiently whetted by these samples, the hikers will want to strike out afield and see the real thing in its natural environment. By carefully selecting hike leaders and arranging a diversified program, active interest may be obtained in this hobby, which, as a recreation endeavor, has no equal in its healthful and satisfying returns.

F. S. MATHEWSON,
Superintendent of Recreation, Union County, N. J.

Items and Abstracts *for* PARK AND PLAYGROUND DEPARTMENTS

Competitive Play vs. Vandalism

WHEN a playground was established in one of our city parks, it was remarked that *the equipment would not last overnight*. But as the directors interested the older boys in pitching horseshoes and soft ball, the boys became the protectors of the park. At this park one summer afternoon, thirteen out of the seventeen boys who were busy running off a horseshoe tournament among themselves, had juvenile court records, and seven had been in jail. Toward the end of the season, several of these boys were interested in crafts work. Not only was vandalism reduced in the park, but also it was greatly reduced in the community.

ARNOLD E. GENTER,
Director of Recreation, Pontiac, Mich.

Pertinent Paragraphs

from papers and reports presented at the Sixteenth Recreation Congress of the Playground and Recreation Association of America, held in Louisville, Ky., last month, make up this page.

More Play Privileges Needed for Little Negroes

IT is imperative that more attention be given to establishing outdoor playgrounds, fresh air courts, and recreation centers for negroes, who make up one-tenth of our population. The tuberculosis death-rate of the negroes is nearly three times that of the whites, and is astonishingly high in congested areas of our cities. In a study of seven cities where there were inadequate facilities for negroes, it was found that the percentage of negro juvenile offenders was from 10 to 28 per cent greater than the percentage of negroes in the population. In some cities negroes are actually discouraged from participating in many wholesome leisure-time activities because the white public seems to believe that the negro does not desire wholesome recreation and that his taste is sordid.

DR. THOMAS E. JONES,
President, Fisk University, Nashville, Tenn.

The Why of Spending Tax Money for Music

PERHAPS more people seek happiness through music than any other means of expression. Music can be made a mighty power to form and guide the thought of the people. I believe it is one of the most potent instrumentalities to prevent crime. When elderly people will travel for seven and eight miles every night in order that they may not miss an opera rehearsal, when clerks, stenographers, immigrants, and others, will practice night after night in rehearsal of a symphony orchestra just for the fun of doing it; and when, way out on the edge of the city in one of the poorest sections a little girl plays over and over a phonograph record of one of the selections in the music memory contest, *I know that we are providing nourishment for the spirit and disproving that art is mere "highbrow stuff."*

W. J. SANFORD, JR.,
Director of Recreation, Dalton, Mass.

Special Leadership for Different Groups and Activities?

THE true recreation leader must subordinate himself to the group. He must have faith in his vocation. He must organize and organize. He must have enthusiasm. He must have courage, wisdom, patience. He must *create* the opportunity that is to knock on the door more than once. And, above all, he must have understanding, human understanding. A leader with these qualities can serve all groups in any activity.

MRS. CHESTER G. MARSH,
Director of Recreation, Westchester County, N. Y.

They Practice What They Preach in Elmira

THE Elmira Recreation Commission is made up of five local men and women who actually engage in various play activities at parks and playgrounds. As a Board, we feel that we are answerable for our actions to the taxpayers. We annually prepare a detailed budget to cover the year's work and carefully consider this before presenting it to the Mayor. We also adopt ideas and plans that have proved successful in other places and that we think will fit into our programs. We try to relieve our recreation director of administrative and financial responsibilities, leaving him free to give all his time to promoting activities.

D. H. DONOHUE,
Chairman, Recreation Commission, Elmira, N. Y.

To Restore Our Ancient Heritage

THE public recreation movement has a great mission in restoring to the American people the parks and playgrounds, forests and streams and other open spaces that they require for health and happiness. Important, too, is the education of the people in the use of these areas and the infinite resources the outdoors offers for lifelong enjoyment. Here trained leadership is very essential.

—Message to the Congress from
MRS. THOMAS A. EDISON,
Member, Board of Directors, Playground and Recreation Association of America.

CITIES - - TOWNS - - VILLAGES ARE CUTTING ELECTION COSTS BY USING VOTING MACHINES

IN one state after another voting machines—the modern mechanical way of voting—are supplanting the old-fashioned paper ballot to the satisfaction of officials and public alike. Reports from users of machines indicate that elections have been handled with a greater ease and dispatch than before.

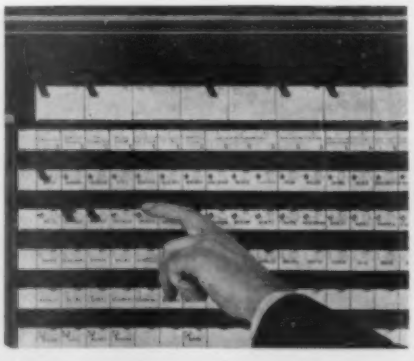
The cost of voting machines can be met out of savings which they permit. Folders describing their advantages will be sent on request.

Address Dept. A-14

IN marked contrast to the wastefulness of the paper ballot system the voting machine affords many opportunities for savings. Voting machines avoid costly recounts, eliminate spoiled ballots and speed up elections. Many communities have cut election costs almost in half by using machines.

Automatic VOTING MACHINE CORPORATION

JAMESTOWN ~ NEW YORK



Left—Face of machine showing the mechanical indicators. No pencil is needed and you cannot possibly spoil a ballot. Right—A close-up of the counter compartment showing candidates' total vote as recorded accurately by series of adding machines.

Illinois Supreme Court Decision Does Not Invalidate Chicago's "No Parking" Regulations

ON October 19 a decision was handed down by the Supreme Court of Illinois which, in the early newspaper reports, was misinterpreted as putting an end to the prohibition of parking in the Loop District of Chicago. The *Chicago Tribune* of the following morning reported the decision under the heading, "Loop Parking Ban Invalid, Court Rules." The fact is, however, that the decision was based on the ordinance which became effective January 10, 1928, under which vehicles were not allowed "to stand" on any public street or alley within a certain district and during certain hours. An amended ordinance, however, had become effective March 28, 1929, which prohibited such standing of passenger vehicles "for a period of time longer than is necessary for the reasonably expeditious loading or unloading of passengers, provided such loading or unloading shall not consume more than three minutes," and of commercial vehicles "for a period of time longer than is necessary for the reasonably expeditious loading, unloading and delivery or pick-up of materials, provided such loading, unloading and delivery or pick-up shall not consume more than thirty minutes."

In a letter to THE AMERICAN CITY, dated October 22, 1929, Leslie J. Sorenson, City Traffic Engineer of Chicago, writes:

"We realized the faulty language of the first ordinance and believed at the time that the ordinance as drawn was illegal, and therefore had the second ordinance passed by the City Council in March of this year. The second ordinance is specific and does not contain the objectionable features of the first ordinance whereby it was illegal to stand a vehicle for any time for any reason. . . . The status of the Loop parking remains the same as before the decision of the Supreme Court, and is being enforced in the same manner."

Wisconsin Traffic Ordinance Adapts Department of Commerce Model to State Law

ANTICIPATING the date when the new state traffic code of Wisconsin goes into effect, the League of Municipalities of that state has sponsored the careful drafting of a Model Municipal Traffic Ordinance, which is published in full in the October issue of *The Municipality*, its official publication. This instrument follows the arrangement of the model ordinance issued by the National Conference on Street and Highway Safety of the Department of Commerce and is developed with particular reference to the requirements of Wisconsin municipalities and of the new 1929 state traffic law. Its author, City Attorney Martin R. Paulsen, of Racine, had as consultants in its preparation officials of the League and of the state. Although this model ordinance has been prepared with the idea of its appropriateness for adoption as a whole by cities and villages of the state, it is offered, according to Maxwell H. Herriott, Chairman of the Model Ordinance Committee of the League, primarily as a source of guidance and aid to city attorneys in drafting local legislation.

Items and Abstracts *for* FINANCE AND LEGAL DEPARTMENTS

Prequalification of Bidders in Philadelphia

A RECENT ordinance of the city of Philadelphia requires that contractors must show that they possess experience, equipment and capital before presenting their bids for public works construction contracts. Commending this plan, the Philadelphia Bureau of Municipal Research, in its bulletin, *Citizens' Business*, says:

"The purpose of the ordinance in providing for the elimination of those not qualified before the bids are opened is to relieve the awarding official of the responsibility of rejecting a low bid of an irresponsible bidder and the consequent importunities of the low bidder and his backers. It is true that the awarding official has the right to reject the lowest bid if the bidder is irresponsible, but in practice such rejection is difficult. Too often the awarding official faces the alternative of awarding to an irresponsible bidder or of rejecting the low bidder and having his judgment and motives severely criticized by the public and the press. It is better, therefore, to decide the question of responsibility before the situation is complicated by knowledge of prices bid.

"The new ordinance should prevent the delays that frequently result from injunctions when a low bid is rejected. It should save the irresponsible bidder the time and cost of preparing a useless bid, and the embarrassment and injury of a rejection. It should help to assure the qualified contractor intelligent and responsible competition, freed from the inroads of the ignorant and reckless."

A general article on prequalification, by Philip A. Beatty, staff engineer of the above Bureau, appeared in *Public Management* in August. His conclusions are:

"On private work, bids are requested only from those contractors believed to be responsible. The movement to control the irresponsible contractor on public works is gaining strength; and prequalification, an ancient and satisfactory restrictive method, seems the most practicable means. It seems applicable to construction contracts, and no more subject to abuse than the existing system. Under a properly standardized system, it should benefit all connected with or affected by the construction industry."

An opposing view was presented at the recent convention of the New Jersey League of Municipalities by David C. Boswell, an abstract of whose remarks appears at page 150.

The Municipal Bond Market

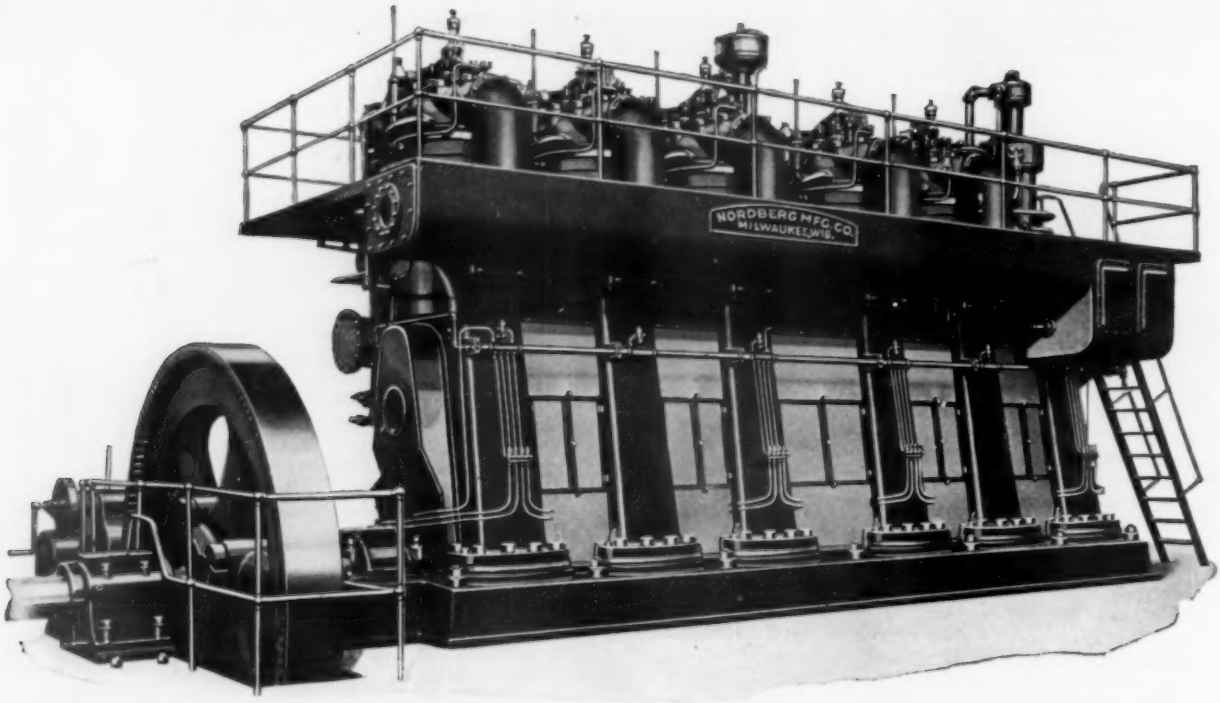
By SANDERS SHANKS, JR., EDITOR, *The Bond Buyer*

THE long-awaited improvement in the bond market arrived during the second week in October, fixed interest-bearing issues responding to the easier condition of the money market. The offering of a $4,037,000 bond issue by the city of Baltimore, Md., on October 10 offers an illustration of the way the municipal bond market turned. Until a few days prior to the date set for opening bids, Baltimore bonds were selling at a price to yield 4.40 per cent. Almost overnight, the outlook had brightened to such an extent that bankers felt justified in placing the new bonds on a 4.30 per cent yield basis. The city benefited to the extent of something like $50,000 through the market's timely advance.

Whether or not the improvement is to be a permanent one, is anybody's guess. If the nation-wide speculative orgy in stocks has definitely reached its end, and that seems the fact, bonds should come back into their own. Temporarily, however, the catastrophic collapse in the market may retard the progress of bonds as investors unload the contents of their strongboxes in an effort to protect share holdings which, in many instances, have declined below their real value in any normal market.

The following table, giving the details of recent sales of new issues, indicates the current level of municipal bond values:

Amount	Municipality	Rate (%)	Maturity	Net Basis (%)
$4,037,300	Baltimore, Md.	4	16-17-yr. (ser.)	4.41
110,000	Westport, Conn.	4¾	1-22-yr. (ser.)	4.62
25,000	Dorchester Co., Md.	4½	18 2/3-yr. (avg.)	4.63
730,000	King Co., Wash.	4¾ & 5	5½-10-yr. (op. avg.) & 26-yr. (avg.)	4.818
4,490,000	Dallas, Texas	4½	1-40-yr. (ser.)	4.86
475,000	New Castle, N. Y.	5	11 5/6-yr. (avg.)	4.89
100,000	Black Hawk Co., Iowa	5	5½-10½-yr. (op. avg.)	4.97
1,235,841	Flint, Mich.	5	13¾-yr (avg.)	5.00
1,973,000	Atlantic City, N. J.	5¼	22½-yr. (avg.)	5.13
72,998	Pickaway Co., Ohio	5¼	5 1/3-yr. (avg.)	5.24
200,000	Beverly Hills, Calif.	5½	1-40-yr. (ser.)	5.41
14,000	Liberty, N. Y.	5½	1-14-yr. (ser.)	5.45
225,000	Lexington, N. C.	6	14 2/3-yr. (avg.)	5.82
6,900	Los Angeles, Co., Calif.	6	7 1/3-yr. (avg.)	5.97



Lubbock, Texas to install a Nordberg Diesel Engine in its new Plant

The City of Lubbock, Texas, has long been a user of Diesel power. Like many other cities, the capacity of the plant has been outgrown. Larger and more efficient units were needed. An entire new plant is to be built and for the initial installation, a 1250 Nordberg Diesel Engine was chosen, the same type as shown above. In this respect, Lubbock is following the examples set at Ponca City, Oklahoma; Carthage, Missouri and Marquette, Michigan, where engines of the same size have established wonderful records for service and performance. Day after day, fifty-two engines of this type, located in all parts of North America, are demonstrating the advantages of Diesel power and superiority of Nordberg Diesels.

Perhaps your City too requires larger and more economical power equipment. If so, there is a Nordberg Diesel that will serve you best. Bulletin NY-3 describes them.

Nordberg Mfg. Co., Milwaukee, Wis.

Builders of Diesel and Steam Engines

NORDBERG

Items and Abstracts *for* CIVIC AND COMMERCIAL ORGANIZATIONS

An Oriental-American Steamship Line Established

THE first prize-winning idea, submitted by T. A. Stevenson, Manager, Chamber of Commerce, Tacoma, Wash.:

Our Chamber's foreign trade bureau prepared and submitted a survey showing that local capital would be warranted in purchasing and operating a fleet of seven freight steamers operating between the United States and the Orient, which the United States Shipping Board proposed selling to private enterprise. A temporary corporation was formed, including a small group of business men, and the Chamber's President and attorney went to Washington to submit the bid. Meantime, a committee raised $65,000 in stock subscriptions to make the purchase. The bid was accepted, the ships were reconditioned and delivered, and are now operating profitably from Tacoma, as the only Oriental line owned and controlled by state capital, serving our state.

A Record-Breaking Fire-Rate Reduction

THE second prize winner, submitted by Lee H. Bierce, Secretary, Association of Commerce, Grand Rapids, Mich.:

Several years ago this city failed to secure a well-established, desirable industry because of our fire insurance rate of $2.85. Investigating, the Association of Commerce learned that our fire-alarm system was a "bunch of junk," but that expenditures of $528 by the city would remedy the condition and reduce our basic rate from Class 3 to Class 2½ and save our policyholders $45,000 annually. We investigated the possibilitity of further reduction, and learned that we would have to meter our water, motorize our equipment, enlarge our mains, etc. The estimated cost was $126,000, and the saving was $40,000 more. The city authorized the expenditure. As soon as necessary municipal improvements were completed, the basic rate was again reduced, saving $85,000 a year—about $60,000 to the Association membership. Since then, our assessed valuation has more than doubled. Therefore, these savings now represent $175,000 annually to the people of the city, and $135,000 annually to the members of the Association. No city in the United States of 300,000 population or less has lower basic insurance rates.

Annual Saving of Over $100,000 in Taxes Incidentally *Achieved*

THE third winning idea, submitted by Raymond B. Gibbs, General Secretary, Chamber of Commerce, Scranton, Pa.:

Four separate tax collection offices maintained in three buildings in different parts of the city for years exasperated Chamber of Commerce members (who pay the largest part of the taxes). A change to a single office required legislation, and overcoming strong opposition among politicians, as tax-collection offices are large sources of political patronage, one office alone producing approximately $50,000. For years, the evil seemed irremediable; but the Chamber of Commerce, reorganized, took this as its first project. Through special legislative committees and action of a determined group of members, the necessary law was passed. Thus the Chamber achieved one of the greatest forward steps in taxation reform this community has ever known. It will result in untold savings in time, energy, and temper, besides a saving of over $100,000 annually in taxes.

Service Ideas Which Won Prizes at the NACOS Convention

An important feature of the annual convention of the National Association of Commercial Organization Secretaries, held in Milwaukee, October 21-23, was the selection of the best "service ideas" out of 127 submitted by Chambers of Commerce throughout the United States. At the opening of the convention a booklet was distributed containing the 40 ideas which in the opinion of the Program Committee were most worthy of consideration. From these, seven prize winners were selected by vote of the secretaries in attendance.

An abstract of each of these prize-winning statements is here presented. For these items THE AMERICAN CITY is indebted to Arthur S. Dudley, Secretary of the Sacramento Chamber of Commerce, who served as chairman of the Program Committee and was elected, at the Milwaukee Convention, President of NACOS for the coming year.

An Industrial Relations Clearing-House

THE fourth prize-winning idea, by The Merchants Association of New York City:

Our industrial relations consultation service, free to members, is an activity of demonstrated value. It is provided by a competent staff member, working with the advice of a standing committee of 13 high executives selected from our membership, all expert in the field of employer-employee relationships.

The service has proved particularly valuable to smaller companies not maintaining specialized departments to handle their employer-employee relationships, who constantly use it as a source of information and assistance.

A Dollars-and-Cents Benefit to the Membership

THE fifth prize winner, by Fred A. La Belle, Secretary, Chamber of Commerce, Youngstown, Ohio:

Our organization created a program aimed at tax stabilization and control in the city and county at a time when taxing problems were harassing the membership. An exhaustive analysis of city, county, and school budgets was the forerunner of thoroughly aroused public opinion and consequent budget reductions to minimum efficient operating bases. The legislative bodies cooperated and adopted the Tax Committee's "pay-as-you-go" and "bond holiday" program, which over a period of several years has practically relieved the city of its total indebtedness without affecting important improvements and actually reducing the tax rate and stabilizing it in the face of a natural trend in increased governmental costs.

A Widening Circle of Cooperation in Poultry Production

THE sixth idea, presented by Karl Lehmann, Secretary, Orange County Chamber of Commerce, Orlando, Fla.:

Because our climatic and other conditions make this county ideal for the production of poultry, and because of the poultrymen who had made beginnings in this industry in the section, the County Chamber of Commerce has promoted organization of poultrymen of the section for cooperative marketing and buying of feed and supplies. Net results have been shown in substantial growth in poultry farms, and increased profits to poultrymen.

The first week the association sold six carloads of eggs to one company—the largest single purchase ever made by that company in the state. This activity has been so successful that it has spread to include the poultrymen of eleven counties, and is now expanding to include the whole state.

Putting Profits in Retailer's Pockets

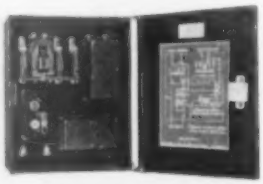
SEVENTH prize idea, submitted by Walter E. Olson, Secretary-Manager, Chamber of Commerce, Mankato, Minn.:

At our weekly Retail Division meetings, merchants are encouraged to speak freely on grievances they wish to bring before the sessions. As one result, numerous "sales," often grossly exaggerating values, have been eliminated, with the result of a better margin of profit for all. This one fact justifies the maintenance of the Division. An old-fashioned community-wide July Clearance Sale and a similar event in January are sponsored as annual events. A successful three-day "Fall Opening," with more than a hundred stores participating, has just been held, and a "Spring Opening" is on the program. Both of these are also annual events.

The VANGUARD of GAMEWELL Improvements

Simplicity
Low Maintenance Cost

1929 Model Codewell
A public alarm for the smaller community—produces rapid code with great carrying power.



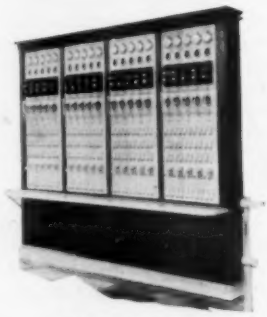
1929 Model Automatic Switch
Turns on lights, bells, sirens and other signaling devices; also, shuts them off at the end of a predetermined period. Operates in conjunction with the municipal fire alarm system.

For more than 60 years, Gamewell apparatus has been outstanding in the municipal fire alarm field. During that time, some 30 or more concerns have come and gone in this business leaving behind them "orphan" systems, but Gamewell installations still go on.

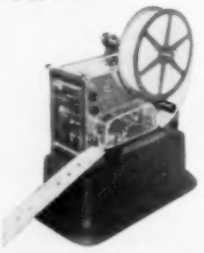
Upon this enviable reputation the Gamewell Company has no intention of resting. Its organization is made up not only of older men with the wisdom and knowledge resulting from many years of practical fire alarm experience, but also of younger men, graduates of technical schools and universities. Thus, we have a happy combination—able men with years of practical experience, plus able men with modern engineering knowledge.

Consequently, we are in a position to provide new apparatus and engineering advice that will better serve the municipal fire alarm field. Here, is shown the Vanguard of the new Gamewell improvement program. It is only the beginning of what is to come. All of these improvements have been turned out within the past two years—a reflection of the progressive spirit of the present Gamewell management.

As Gamewell customers, you can rest assured that when purchasing Gamewell equipment you are getting not only the finest in fire alarm apparatus, but simplicity of design and low maintenance cost, as well. You also know that Gamewell improvements in this field will continue with the same progressiveness that is found in other fields.

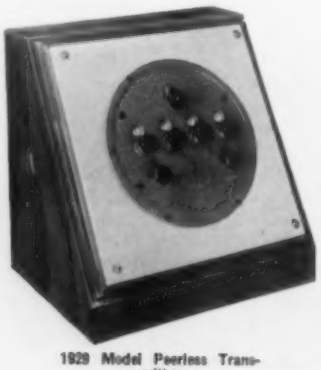


Main Line Relay Board
Central office 5-circuit unit type board, includes many improvements. May be added to as systems grow, without affecting appearance.



1928 Model Excelsior Register
A popular fire alarm recording instrument for use in central offices, fire stations, fire chiefs' homes, water-works, gas and electric plants, or any other place where a single-circuit register is needed.

1929 Model *Street* Fire Alarm Box
Designed for service on the street corner. Includes 18 outstanding improvements.



1929 Model Peerless Transmitter
Used for transmitting box and telephone alarms to engine houses and public alarm.

1929 Model *Master* Fire Alarm Box
Intended for installation on schools, hospitals, institutions, theatres, factories, warehouses, etc. The same design as the ***Street Model***, with the addition of the new *Auxiliary Attachment*.

GAMEWELL

A Box a Block

NEWTON UPPER FALLS, MASSACHUSETTS

Highway Sidewalks Urged by A. S. M. I.

RECOGNIZING the necessity for widespread publicity as a preliminary step toward remedying the lack of sidewalks on many highways, the American Society for Municipal Improvements at its annual convention, held in Philadelphia in October, unanimously adopted the following resolution:

"*Whereas*, in connection with road and highway development on the part of outlying sections of municipalities, towns, counties, and states, there is a nearly universal absence of sidewalk provision for the safety and convenience of pedestrians;

"*Be it resolved* that the American Society for Municipal Improvements . . . record the importance of sidewalk provisions in connection with all public highways subjected to considerable automobile traffic; and that the Secretary prepare an appropriate communication embodying this resolution and secure its publication in engineering and municipal papers, and distribute it to all members of the American Society for Municipal Improvements, urging their activity, including bringing the matter to the attention of the public and officials in their home communities."

First Aid Work for Cincinnati Firemen

AS a result of the recent course of instruction given to officers of the Cincinnati Fire Department, 93 of them have completed the National Red Cross first aid course, it is announced by Colonel C. O. Sherrill, City Manager.

These officers are now qualified to handle first aid instruction work and will teach the other members of the Department until every fireman will be able to do first aid work effectively.

It is believed that the Cincinnati Fire Department is the first of its kind in the country to require that every member be qualified in first aid work. The firemen are reported to be enthusiastic about the work and are eager to assist wherever possible in case of accidents.

Eighteen Police Training Schools to Operate in New York State This Winter

PLANS for regional training of policemen of every city and village in New York State this winter were announced on October 17 by the Advisory Council on Police Training, representing the New York State Conference of Mayors, the New York State Police Chiefs' Association, and the State School for Police.

Eighteen zone police training schools will be in operation this year. Ten such schools were operated last winter with a total average weekly attendance of 2,400 policemen. These schools will be located at Albany, Binghamton, Buffalo, Elmira, Geneva, Jamestown, Kingston, Middletown, Mineola, Plattsburg, Poughkeepsie, Rochester, Schenectady, Syracuse, Troy, Utica, Watertown, and White Plains.

Items and Abstracts *for* DEPARTMENTS *of* PUBLIC SAFETY

A training school for the instructors of the eighteen zone schools will be held this year in Poughkeepsie, beginning on November 11 and ending on November 23. The school last year was operated for only one week. The Advisory Council has decided that instructors need more intensive training than they have heretofore received, so provisions have been made not only to increase the time for the instructors' school but also to add five members to the training staff. Each police department operating a zone school will send its instructor to Poughkeepsie next month. His expenses will be paid by the Mayors' Conference.

Methods of Pay and Training for Part-Paid Fire Departments

"THE method of pay has a far-reaching effect on the discipline of a fire department in which regular and call men are employed," J. E. Taplin, Chief of the Fire Department of Blackwell, Okla., and President of the Southwestern Association of Fire Chiefs, told the members of the 57th annual convention of the International Association of Fire Chiefs at Birmingham, Ala., last month. Mr. Taplin delivered a paper on "The Organization and Discipline of a Paid and Part-Paid Fire Department."

"A new method adopted by a department in a city of 12,000 people by which each call man gets just as much pay for attendance at drills as at fires, seems to produce results that were lacking in other methods of pay. The former plan paid each call man $2 for every fire call, and attendance at weekly drills was obligatory. If a member was absent on his company drill night, $1 was deducted from his pay. Results were fairly good in attendance at both fires and drills. The cost of this service averaged about $100 per month, which amount was included regularly in the yearly budget.

"The growth of the city made necessary the doubling of the number of full-paid men, nine regular firemen now being employed, working two platoons. It was found that most grass fires, trash fires and automobile fires could be handled as still alarms. The result was that the amount the call men had been receiving was cut down far below previous receipts. A lack of interest and attendance at once became apparent at both fires and drills. Previous results from the services of the call men had been so good that the Chief of the Department regretted a falling-off of results, and after a careful study of conditions recommended the following plan:

"Inasmuch as the average cost of the call men to the Department had been $100 per month, it was recommended that this amount be paid them regularly every month and divided in proportion to the total number of attendances at fires and drills. Thus each call man gets just as much for attendance at drills as at fires. Results from this plan have been very satisfactory. There has been an 85 per cent attendance at drills since its adoption. If no general alarms occur during the month, the same amount is paid and divided between the call men in proportion to their attendance at drills. The net result of such a plan is that out of a total of fifteen call men, the city can depend upon from six to ten well-trained firemen whose services cost less than the salary of one regular man. From the foregoing discussion it is apparent that the method of pay has a far-reaching effect on the discipline of this type of department.

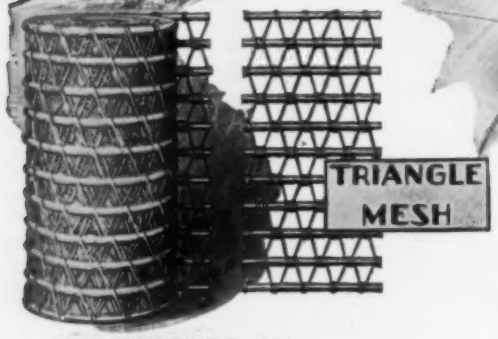
"The training of a part-paid department can best be done by arranging weekly drill periods, preferably at night, at which both regular and call men participate. Actual layouts of equipment, and practice in the use of all appliances commonly used in fire fighting, should be given. Contests between individual firemen and different companies, on which time is taken, stimulates an interest in these drills, and is of great value in making efficient firemen. Lectures on simple hydraulics, and discussions on such questions as 'What is centrifugal force?'; 'Explain the principles of the centrifugal pump'; 'What causes water to rise in a vacuum?'; and scores of others of like nature are very interesting to the average volunteer firemen. Practice in the tying of standard fire department knots should be held frequently enough that all members can quickly and efficiently secure a line for any purpose. If the men are allowed pay for drills, there will always be a good attendance, and at least 1½ hours' instruction can be given at each period. Thus it will be seen that with the institution of regular drill periods and the method of paying the volunteer men, as outlined above, the discipline of the part-paid department is largely solved. It is not necessary that all men drill weekly. If a large number of call men are used, one-half can drill each week, thereby giving each man two drills per month. The total number being smaller, drills every two weeks are to be recommended."

Special Attention Is Directed to

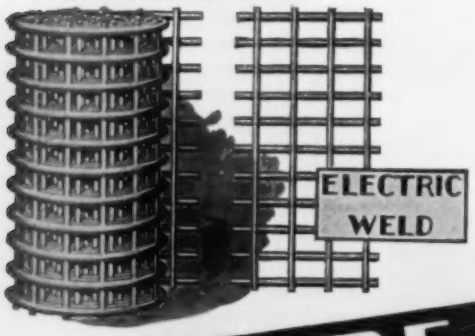
the material on Fire Prevention and Control, and Traffic and Transportation, listed on page 3 of this issue. Outstanding is the authoritative analysis, on pages 90-93, of America's first official state traffic code, adopted by Massachusetts. This is presented by Maxwell Halsey, Traffic Engineer for the Department of Public Works. Note the final section—"The Effect Upon the Motorist."

WHY SAVE PENNIES IN BUILDING And Spend Dollars In Repairing?

Make it a PERMANENT INVESTMENT



FURNISHED IN ROLLS OR SHEETS



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Wire Fabric—made of cold drawn steel—saves maintenance costs—insures longer concrete life and a lastingly good surface.

Cut in easily handled sheets or furnished in convenient size rolls.

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The Steel Backbone for Concrete

If you do not have our new Road Book, a copy will be mailed upon request.

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During November we hope you will remember to mention THE AMERICAN CITY

JAMES C. SULLIVAN
Fire Chief, Lowell, Mass.
(Appointed 1927)

R. M. TAPPIN
Fire Chief, Gardner, Mass.
(Appointed 1927)

THOMAS O. D. URQUHART
Chief of Police, Arlington, Mass.
(Appointed 1905)

MICHAEL H. CROWLEY
Police Chief, Boston, Mass.
(Appointed 1915)

WILLIAM W. HOLBROOK
Police Chief, Framingham, Mass.
(Appointed 1911)

WHO'S WHO IN PUBLIC SAFETY

The 23rd of a Series of Portraits of Fire and Police Chiefs, Which Has Appeared Monthly Since January, 1928

CHARLES B. CORLISS
City Marshal, Gloucester, Mass.
(Appointed 1928)

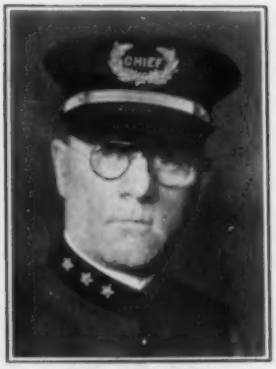
GEORGE F. FITZGERALD
Marshal of Police, Holyoke, Mass.
(Appointed 1928)

HOMER R. MARCHANT
Fire Chief, Gloucester, Mass.
(Appointed 1918)

ARTHUR MONTMENY
Fire Chief, Chicopee, Mass.
(Appointed 1921)

JOHN J. McBRIDE
Chief of Police, Cambridge, Mass.
(Appointed 1918)

E. H. BARBER
Chief of Police, Duluth, Minn.
(Appointed 1923)



JOHN J. O'BRIEN
Police Chief, Belmont, Mass.
(Appointed 1929)

J. J. PSZANOWSKI
Police Chief, Omaha, Nebr.
(Appointed 1928)

HENRY C. LINDHOLM
Supt. of Police
Minneapolis, Minn.
(Appointed 1929)

All Clear for Traffic ▸

Briefly:

No Detour
No Pavement to Replace
No Loose Fill to Maintain
Actual Cost 44% of Estimate

Culvert Jacked Through Solid Rock Ledge By West Virginia Maintenance Crew

By A. W. PAINE
Division Maintenance Engineer, W. Virginia State Road Commission, Parkersburg.

Three culvert replacements were completed at a saving of half of the estimated cost of trenching, and without interrupting traffic.

ABOUT fourteen miles south of Parkersburg on the Parkersburg-Charleston road, as it appeared ... observed ... water in each case, a 24-inch pipe was ... size ha... enough room ...

When you need openings for additional drainage, for pipe conduits, for passage-ways or any similar purpose, use the Armco Jacking Method. Armco engineers will be glad to give you the benefit of years of actual field experience. They have facts obtainable through no other source. They are available on every Armco drainage project.

ARMCO

Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand

ARMCO CULVERT MANUFACTURERS ASSOCIATION
MIDDLETOWN, OHIO

Member of the National Municipal League

ARMCO CULVERTS

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NOVEMBER, 1929
Vol. XLI, No. 5

The American City

443 Fourth Avenue
New York
50 Cents, $4 a Year

A Platform of Progress for Municipalities and Counties:

1. *City and regional planning and zoning for spacious development*
2. *Streets and roads that are well built, well lighted, well cleaned*
3. *An abundant supply of pure, soft, palatable water*
4. *Sanitary and economical disposal of sewage and garbage*
5. *Fire and police departments properly trained and equipped*
6. *Thorough and uniform traffic control; fewer grade crossings*
7. *Plenty of parks, parkways, playgrounds, and swimming pools*
8. *Administrative efficiency and citizenship aid in bringing these things to pass*

Three Outstanding European Airports

And Practical Suggestions for American Aviation Based on a Study of Commercial Aeronautics in Europe

By CLARENCE M. YOUNG
ASSISTANT SECRETARY OF COMMERCE FOR AERONAUTICS

PRACTICALLY every important capital in Europe is now served by one or more air lines. Austria, Belgium, Czecho-Slovakia, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, the Netherlands, Poland, Russia, Spain, Sweden, Switzerland, all are utilizing aircraft. Despite the handicap of numerous nearby international borders, air commerce in Europe is growing steadily.

Last year, Germany, for example, flew 7,030,565 miles, carried 115,000 passengers, handled 1,130,000 pounds of mail, and transported 4,282,000 pounds of baggage and express. France was not far behind with 3,753,133 miles flown in regular service, 21,000 passengers carried, 1,607,280 pounds of mail and 2,755,000 pounds of baggage and express. The figures for other European nations might also be cited; but suffice it to say that practically every country in Europe is making large strides in civil aeronautics.

Last year, the postal administration of Spain started a service whereby mail for international air transport is received by Spanish post-offices for sixteen different European nations. The Italian Government is encouraging the use of private aircraft, both of national and of foreign registration, by providing airport facilities and services. During the first three months of operation of the through lines, more than 5 tons of mail were carried between England and India. Great Britain has, in addition to its numerous scheduled air lines, 13 subsidized flying clubs and 5 independent ones. These subsidized flying clubs at the end of 1928 had 3,288 members, compared with only 780 three years earlier, and now have 420 qualified pilots.

AMERICA'S NEW ASSISTANT SECRETARY OF COMMERCE FOR AERONAUTICS, MAJOR CLARENCE M. YOUNG

This picture, taken at Croydon, shows Major Young standing beside the Department of Commerce airplane in which he made a tour of European airports last spring

Facilities of European Air Services

As an instance of the services available in Europe, air mail from Berlin is delivered in London by noon of the following day. On the return flight, mail leaving London at 8:15 in the morning arrives at Berlin at 5:25 the same afternoon. A combination of train-plane service permits the transfer of mail between Berlin and Barcelona, Spain, in 24 hours.

Some idea of the rapid developments taking place in European air commerce may be had from the fact that a single company in Germany, the Deutsche Luft Hansa, started operating 30 airlines in April, 1926, and added 24 additional lines within a few months. This number had increased to 90 by the summer of 1928; of these, 84 were operated by the company, and 6 were maintained in cooperation with foreign countries. Special express services are now operated between London, Amsterdam, Hanover and Berlin, and between Paris, Cologne, Essen, Mulheim and Berlin. As the result of an agreement entered into between this company and the German Imperial Railways, express can now be sent to any place in Germany where there is a railway station, through the combined utilization of air and rail transport. Following the successful introduction of the through air and rail service in 1927, the Luft Hansa arranged with the German railroad company for the transfer of passengers, effective September 1, 1928.

Passengers may start a journey by air or first-class railway and change to the other at will with but little formality.

The Imperial Airways, Limited, of London, maintains a regular passenger, mail and express service between London and Paris—a distance of 225 miles—making one to five round trips per day. During the eight years ended March 1, 1929, Great Britain's Government spent approximately $19,000,000 for the promotion of civil air transportation. In Germany, too, the national, state and municipal governments aid generously in the promotion of air transportation — spending some $20,000,000 annually for this purpose. France's 1929 appropriation for all Government aeronautic activities amounted to over $70,000,000.

Because of the steady growth of air transportation in Europe, the Continent has developed a number of excellent airports; three of these airports are outstanding — Croydon at London, Le Bourget at Paris, and Tempelhof at Berlin. Each of these airports is approximately 400 acres in area, has similar ground equipment, accommodates similar traffic, and exercises about the same type of control over activities; moreover, the respective governments of all three adhere to the International Convention of 1919, which makes them all amenable to practically uniform regulations. There is a sufficient difference in the local management, however, to warrant separate reference to each.

The Croydon Airport (London)

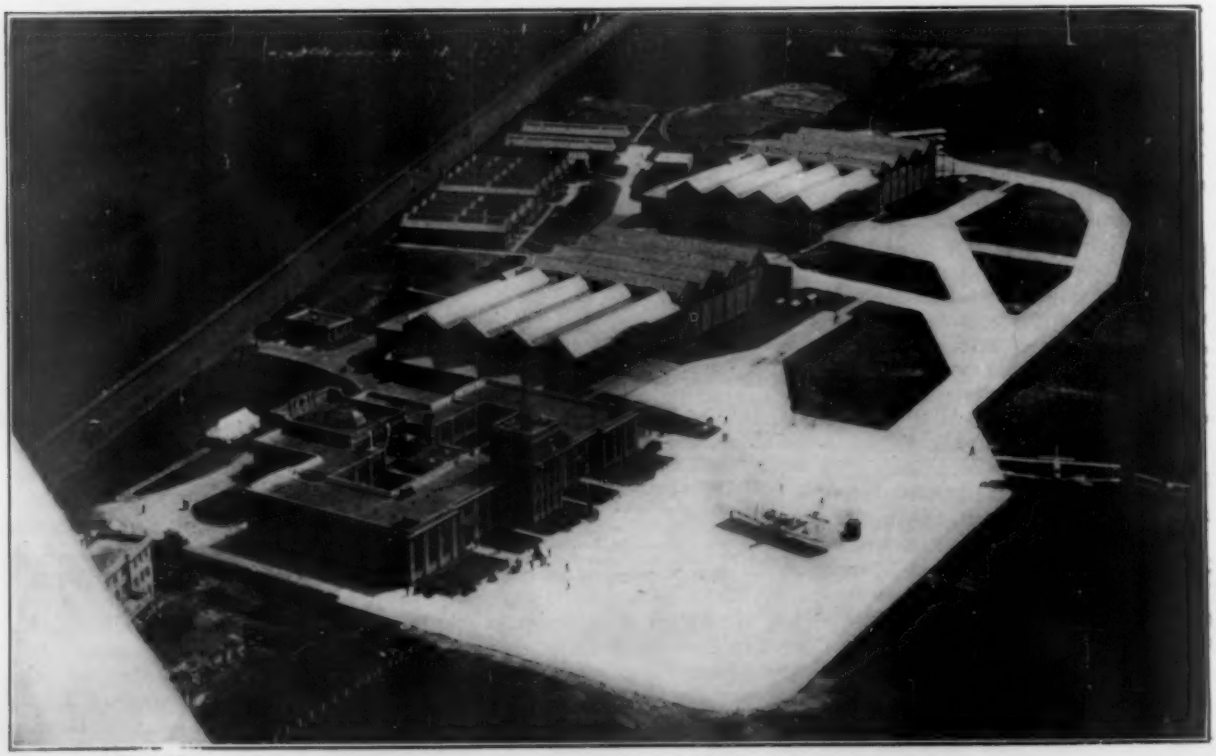
The Croydon Airdrome, which is frequently referred to as the London Terminal Aerodrome, is located near the village of Croydon on the outskirts of London; it is within about one mile of a suburban train station, and can be reached by bus, automobile or taxicab. As it takes from 45 minutes to an hour to reach it from downtown London, depending upon street traffic and train service, this time element is not favorable, especially when considered in connection with the comparatively short flights of about two-and-a-half hours to Paris and Brussels; but apparently the determining factor in the selection of this site was available area.

The administration building at Croydon is extremely well arranged. On the first floor is a large, well-equipped waiting-room with the ticket and information offices of the various airlines opening into it on all sides through a series of alcoves. There are also provided a buffet, a news-stand, a ladies' waiting-room, and a large map of the various air routes showing weather conditions at various locations. This map is kept current, and a very interesting method of showing departures and arrivals of airplanes is maintained.

An enclosed passage in which passport and other formalities are observed, leads from the waiting-room to the airdrome. This corridor, which is part of the building, terminates at the platform upon which the departing plane is awaiting its passengers. When passengers board the plane, their luggage has already been placed aboard by attendants and properly stowed away. Another passage leading from the airdrome to the waiting-room is quite similar except that it takes the passengers through the customs office as well as through the passport corridor. Here again the luggage causes the passenger no annoyance; it is taken from the plane to the customs counter for examination in his presence, and from there to the airline's bus or to the passenger's other means of transportation. There are no other entrances or exits either to or from the airdrome; there are, however, suitable places where motor cars may be parked and where the public may sit or stand to watch activities, but they are outside the enclosure of the airdrome landing field.

The second floor of the administration building contains a large number of office rooms which are occupied by the airdrome staff, including the weather bureau, the aircraft inspectors, and the airdrome officers. Other offices on this floor are leased to various air lines for the use of clerical personnel and local representatives; and still others are available for expansion as activities increase.

An integral part of the administration building is a four-story tower at the side of the airdrome, which is surmounted by a radio mast. This tower contains a chart or map room and a



International News Photo

PRINCIPAL BUILDINGS AND RUNWAYS OF THE CROYDON AIRPORT, LONDON

Photograph by Ewing Galloway, New York

LE BOURGET, FRANCE'S MOST FAMOUS AIRPORT

radio room; from a platform surrounding it, traffic signals are displayed controlling the movements of arriving and departing planes.

Immediately adjoining the administration building is a freight and merchandise building for storage and customs purposes. Also provided is a privately operated hotel, just a few feet away, which has comfortable rooms, ample restaurant facilities, and a roof which has been made available for guests wishing to observe airdrome activities. The hangars and shops are of conventional type and are located in the vicinity of the administration building—the shops for engine repair, overhaul and testing being in the rear of the hangar line. All buildings, of course, are of fireproof construction.

Among the several different airlines operating from the Croydon Airdrome are Luft Hansa (Germany), Imperial Airways (Great Britain), Air Union (France), Sabena (Belgium), and Royal Dutch or K.L.M. (Holland). Each line maintains fixed schedules; and their arrivals and departures are, of course, a matter of regularity which naturally contributes materially to the control of activities. Each plane, upon arriving, whether in scheduled operation or otherwise, must taxi to the platform, or "tarmac," as it is called, and report in; and the same is true of departing planes, which must taxi from the platform to the point of take-off and there receive a signal from the tower before starting the take-off run.

Only a relatively small amount of itinerant or non-scheduled flying is done at this airport. Flying instruction for the most part is carried on at flying clubs located elsewhere. This means that the dominating activity at Croydon is scheduled service.

Le Bourget Airport (Paris)

The most famous airport in France is Le Bourget, located on the outskirts of Paris at about the same distance from downtown Paris as is Croydon from London. There is a street-car service most of the way; but as this is somewhat devious and comparatively slow, the best way to reach the airport is by automobile, bus or taxicab. Under normal traffic conditions the airport can be reached in about 45 minutes.

Like Croydon, Le Bourget comprises approximately 400 acres, and the arrangement of buildings with respect to the landing area is quite similar. The administration building, however, is not as elaborate nor does it contain as great a variety of activities—the meteorological and radio stations being located in a smaller building nearby. Entrance to the airdrome is effected through a customs and passport room, above which is an excellent restaurant. An observation tower is provided on which an airdrome employee is constantly stationed for the purpose of observing aircraft operations both on the airdrome and in the air. The hangars are located on either side of the main building.

The flying field proper is, of course, suitably enclosed; and no one is admitted except the airdrome staff, airline employees, other persons having business therein and, of course, passengers entering through the customs office. Adequate parking and observation area is provided outside the enclosure. In addition to the several organizations already enumerated which use Croydon as a terminus, there are two or three other French lines operating from Le Bourget. There are also rather important local operations, taking passengers on sight-seeing trips over Paris and environs.

As at Croydon, each arriving aircraft must proceed to the platform in front of the customs office and report in. Departing aircraft must also leave from the same place before taxiing to the point of take-off.

The Tempelhof Airport (Berlin)

Germany's chief airport, Tempelhof

Airdrome, is located within the city limits of Berlin, approximately 15 minutes from the business section by automobile or bus. It now serves 29 different airlines. Street cars pass within a comparatively short walking distance, and the service is sufficiently frequent for convenient use. Indicative of the ease with which this airdrome is reached, it is not uncommon for 20,000 people to visit it during a summer week-end when aircraft activities are at their height. Ample facilities for comfort and entertainment are provided, and the airdrome takes on a gala atmosphere upon the slightest provocation, even though a small admission charge is ordinarily made. The proximity of the airdrome to the city is a decided advantage and makes it extremely popular, not only with the interested observers but with the users of air transport as well. On one occasion recently, more than 200,000 visitors assembled there to pay respects to some returning aviator of distinction.

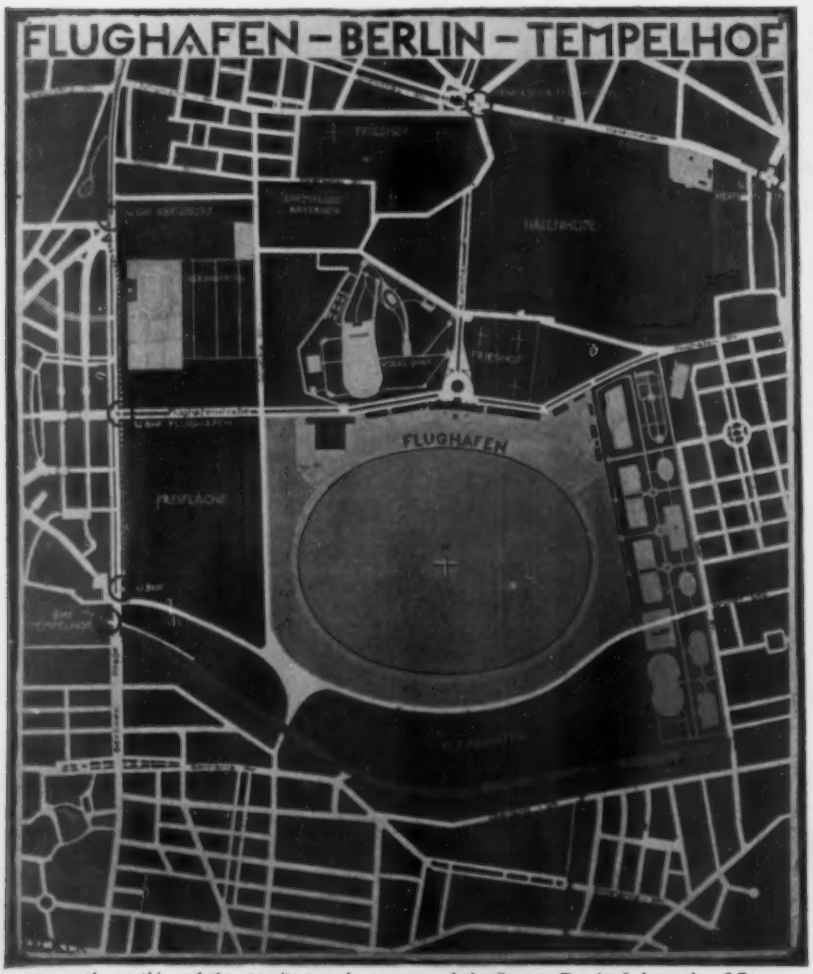
Here the buildings, including administration, hangars, and shops, are arranged in conventional manner along one side of the airdrome—the center of the group being the administration building. This building contains the offices of the various airport companies, as well as the radio, weather and other activities, including post-office, customs office, airport restaurant, waiting-room, and the traffic offices of Deutsche Luft Hansa.

As is the case at Croydon, entrance to the airdrome is effected through the customs and passport offices by way of a canopied corridor to the loading platform. Immediately in front of the administration building and on either side of the entrance corridor, is a large enclosure provided with tables and chairs, which constitutes an outdoor restaurant and beer garden. Between it and the loading platform is yet another enclosure to which spectators are admitted.

In front of the administration building is a control tower from which all aircraft traffic, whether incoming or outgoing, is controlled by signals from the airdrome police. Five permanent hangars, of fireproof construction and unusual size, are located on either side of the administration building; they are provided with steel doors electrically driven and opening horizontally. Between the hangars are large repair shops, well equipped with overhead carriers, supplies, tools and machinery. Between two of the hangars is located an underground fuel tank of 40,000 litres capacity; in front of another is a 20,000-litre tank; and in front of a third is a 100,000-litre tank, the latter being equipped with electrically driven, centrally controlled pumps.

The entire airdrome is surrounded by a substantial fence, and in addition to obstruction lights, beacons, etc., the effective landing area is enclosed with boundary markers made up of neon tube units about 7 feet in length spaced at approximately 300-foot intervals. An unusual but very desirable feature of this port's equipment is a broad, hard-surfaced apron extending the entire length of the hangar line. Approximately 300 feet in width, this apron greatly facilitates the maneuvering of planes in and out of the hangars and taxiing to and from the loading-station, which is located in front of the administration building.

A hotel has not yet been provided here, but it is believed existing plans contemplate the enlargement of the administration building or the addition of a suitable building for that purpose. Meanwhile, the restaurant concession has been let to the Mitropa, an organization which operates the dining-cars on the railroads in Germany and which has also the buffet privileges on the Luft Hansa airliners.



Photographs on this and the opposite page by courtesy of the German Tourist Information Office, New York

PLAN OF THE TEMPELHOF AIRPORT, BERLIN

The small dark circles indicate the location of a numer of subway and railroad stations, convenient for the public. The airdrome is shown in the center. Below it, and also above it to the northwest, are colonies of small gardens. The airport street borders the airdrome on the north. The line of the Berlin City Railway is seen running from west to east toward the bottom of the picture. Facilities for comfort and pleasure surround the airdrome

How American Aviation Can Profit from Europe's Experience

My recent survey of European airports convinced me that three things are fundamentally applicable to airport management and administration in the United States: (1) adequate jurisdiction with a qualified executive in charge; (2) definite control of all activities, including their segregation when possible and advisable; and (3) uniform rules and regulations governing the operation of aircraft in the vicinity of the airport, and in landing and taking-off. I am also convinced that the problems of airport management can be successfully handled without difficulty, if a competent executive with suitable authority exercises intelligent control over all activities, in conformity with uniform requirements.

A combination of reliability, comfort, and speed is fundamental to the success-

ful operation of any air transport system, whether it be in the United States, Europe, or elsewhere. This involves practically all elements entering into such a system—aircraft, pilots, ground personnel and equipment, airways, schedule maintenance, radio and weather service, and adequate airports. Fortunately, services operating wholly within the United States are not concerned with the more or less annoying business of passports and customs caused by the many border crossings in Europe. Many of the air journeys there, even though they are of only two or three hours' duration, place one in several different countries, with different languages, different customs and the usual examination of passports and luggage, formalities and immigration, public health, etc. Here, we can fly almost 3,000 miles and still be in the same country. Consequently, we seldom, if ever, see or hear of a passport or customs official, unless, of course, one of the several existing international services is used. This is a distinct advantage, and will react most favorably on our air transport system.

Despite this important advantage, however, American manufacturers and operators realize that they can profit by the long operating experience of the European lines, and numbers of representatives of our aeronautic industry have visited Europe at various times for the purpose of studying their methods. One thing which they have learned from Europe is the importance of details, the refinement of comparatively minor things which either irritate or gratify the users of air transport. The manner in which passengers are transported to and from the airport, the facility with which their luggage is handled for them, the ease with which they are transferred to and from the aircraft, their comfort in the plane while en route, all furnish examples of these details and refinements.

While the actual transportation from one airport to another may seem to dominate all other phases, the passenger will not overlook the fact that he was obliged to trundle his own luggage in a taxi to the airport, to find his own way to the aircraft by way of the propeller blast, or to locate his own seat reservation. Nor does he like to amuse himself en route by wondering what location he is passing over, by asking himself whether the aircraft is on schedule, or wondering where a blanket can be found when altitude makes the cabin chilly, or why the belt contraption is placed on his seat, or why the aircraft bounces around in rough air, without knowing that it is a normal condition in the particular localities. American air transport lines have already recognized the importance of these and numerous other similar details, and are giving very careful consideration to the comfort and convenience of the traveling public. Most European lines, too, have given this phase of air transport a great deal of thought, and that is one reason why these lines have been so highly regarded.

AIR VIEW OF THE TEMPELHOF FLYING FIELD

MAIN BUILDING OF THE TEMPELHOF AIRPORT AT NIGHT
This is the side where planes take off

America's Air Transport Service — A Three-Year Growth

Because of America's freedom from international boundaries, great distances between centers of population, high standards of living, density of commerce and other inherent advantages, the development of a great air transport system is inevitable. Already American airplanes are flying more than 80,000 miles per day; already we have more than 15,000 miles of fully equipped airways; already we have a thousand airports, both municipal and commercial, in active operation, with an additional 1,200 either proposed or in the process of construction, and a number of the former are rapidly becoming the equal of any of the famous airports of the world.

It is necessary to be mindful that practically all of this has been accomplished within a period of three years, without direct Government subsidy, and private enterprise entirely. During that brief period of time the air transport organizations have been able to train personnel and gain valuable operating experience, the aircraft manufacturer has concentrated on the design of aircraft especially adapted to the transportation needs, and the Department of Commerce has made substantial progress in the development and establishment of a comprehensive airways system fully equipped with all known aids to air navigation. It all provides a most advantageous promise for the further extension of the air transportation services of the United States, whether for mail, merchandise or passengers, to any extent for which there can possibly be a demand.

America's First Official State Code on Traffic Signals Issued by Massachusetts

By MAXWELL HALSEY

TRAFFIC ENGINEER FOR DEPARTMENT OF PUBLIC WORKS, THE COMMONWEALTH OF MASSACHUSETTS

THE area of influence of the automobile has been increased from the individual city or town to the county, the state and even the interstate region. With this expansion of driving habits, the motorist has been expected to familiarize himself with the regulations and devices to be found in each jurisdiction through which he travels. Lack of uniformity has made this exceedingly and increasingly difficult. As a natural result of the growing number of vehicles upon the highways, numerous and varied devices for the expedition of traffic have appeared.

The unnecessary delay and confusion caused by these conditions had served to crystallize the feeling throughout the Commonwealth of Massachusetts that steps must be taken toward standardization. Early last year the Legislative Court of Massachusetts, recognizing the seriousness of existing conditions, passed Chapter 357, Act of 1928. This provided for basic uniformity by placing the Department of Public Works in a supervisory position and by requiring that all traffic control signals installed and/or operated must have the written approval of said Department.

In order to facilitate the business of approving all signals, and as a guide to city and town officials, the Department has now prepared a bulletin setting forth the standards required before its approval would be given. This bulletin covers the entire field of traffic control signals and is the first definitive statement covering that subject. It is in basic conformity with the national standards as set forth in the report of the committee of the American Engineering Council on Street Traffic Signs, Signals and Markings.

If traffic control signals are to be effective, they must be used only where there is a proper demand for them; they must be of good design, they must be installed correctly, and they must be operated properly. To meet these requirements, the code establishes standards of utility, design, installation and operation.

Standards of Utility

In order to prevent the installation of unnecessary and harmful signals, the code provides that no signal may be installed or operated unless conditions warrant its use. Minimum conditions are established, below which approvals will not be given. Where installations are to be justified solely by vehicular volume, there must be at least 500 vehicles entering the intersection per hour, of which 25 per cent, or 125 vehicles, must be upon the cross street. It should be remembered that this figure is strictly minimum and is not to be taken as a condition for which the Department would recommend a signal installation. It is merely used to prevent installations which would be of a detrimental character, until such time as the engineering studies now under way may be completed and a scientific basis for volume requirements established.

If pedestrian traffic is to warrant the installation, there must be at least 250 pedestrians crossing the intersection each hour in addition to the requirement of 500 vehicles per hour. It will be noticed that the number of pedestrians merely replaces the amount of cross traffic required. Unless there exists a conflict of movement either between vehicles or between vehicles and pedestrians, there is no necessity for signals as far as the mere volume is concerned.

If signals are to be justified by a necessity to control speed, excessive average speeds must be shown. If an additional signal is to be installed upon the basis that it is needed to assist an existing system, then it must be shown that it will add to the efficiency of that system. Where unusual conditions exist, traffic-actuated devices may be installed regardless of the above restrictions.

Any of the above warranting conditions must be shown by actual traffic counts, thus placing the entire method of justifying signals upon an engineering basis.

Standards of Design

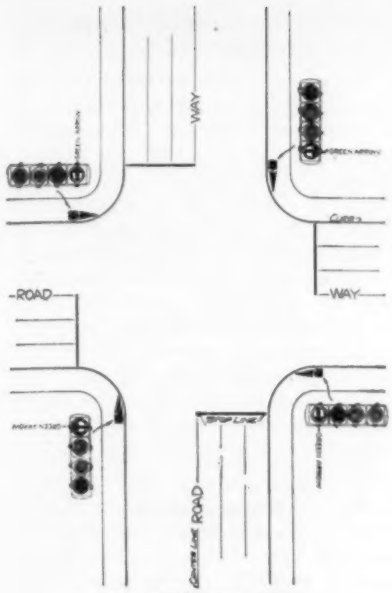
In order to make it possible for all motorists to be faced with traffic signals which appear the same and give similar indications, the code has specified the type of signal indication to be used. The type of signal chosen is that now in use in a great majority of installations throughout the country. The standards provide for a signal face having three round lenses with a diameter of 8 inches each. These lenses are to be red, yellow, and green, with the red lens at the top, the yellow lens in the middle and the green lens at the bottom. Where special turning conditions require it, a green arrow is permitted. This must be located below the green lens. Lettering is not permitted on lenses, because it impairs visibility, and the meaning of colors is legally specified. In order to insure a good signal indication, lenses are required to be independently illuminated by a traffic lamp of not less than 60 watts, and to have a visibility from all points up to 300 feet.

The colors used in signals are required to have the following meanings: Red is a stop indication. Yellow is a change indication. Green is a go indication, and where the green arrow is permitted, it is a turn indication. Where the red and yellow lenses are shown simultaneously, they constitute a special pedestrian period indication. The flashing red is a stop-before-entering indication, and may be used only upon through ways or boulevard stop streets. The flashing yellow is a cautionary indication.

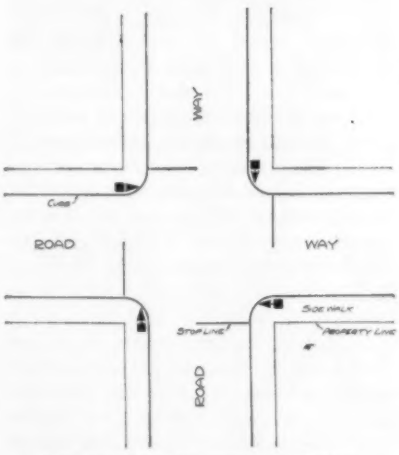
"A Standard Code for Traffic Control Signal Installation and Operation"

In the opinion of Miller McClintock, Director of the Albert Russel Erskine Bureau for Street Traffic Research, of Harvard University, the new document bearing the above title will have a more important effect on sane progress in traffic control than any other report with which that Bureau has been identified. This new Code has been prepared jointly by Dr. McClintock and by the author of the accompanying article, Maxwell Halsey, who has been for two years an Albert Russel Erskine Fellow, and is now Traffic Engineer of the Department of Public Works, of the Commonwealth of Massachusetts.

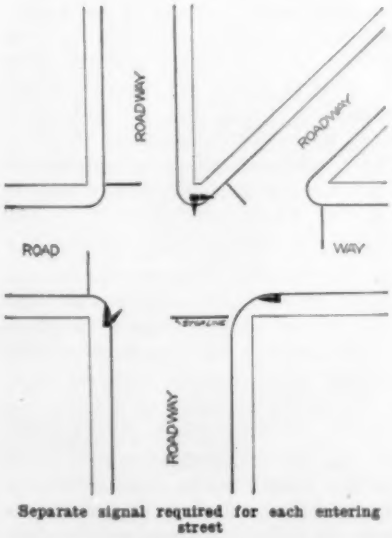
The full text of the Code, with appendixes containing forms for applications and permits and traffic count forms, has been published as Traffic Bulletin No. 2, obtainable on application to Mr. Halsey, at State House, Boston.



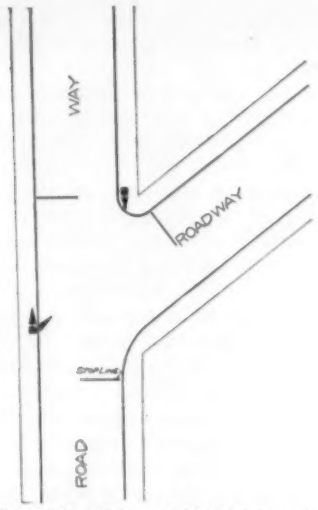
Use of right turn arrow



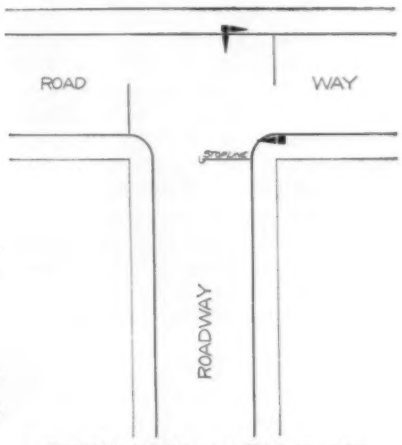
Standard far right corner installation



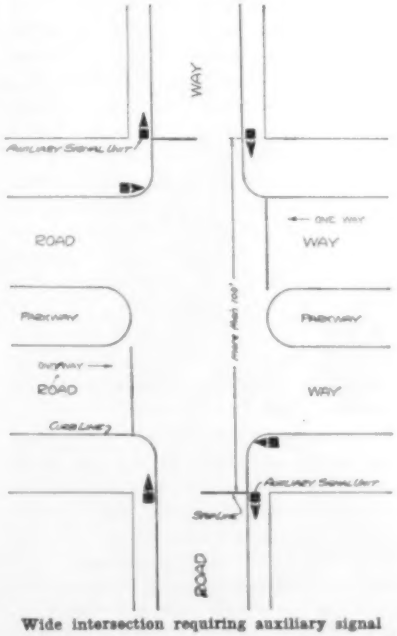
Separate signal required for each entering street



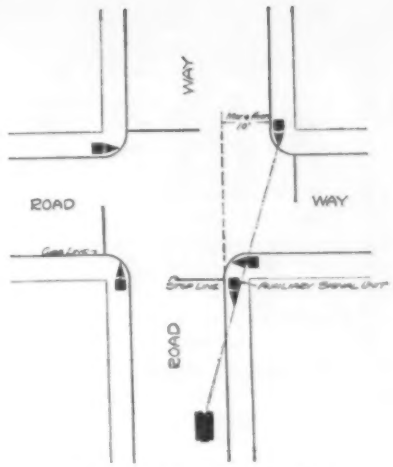
Typical installation at forked intersection



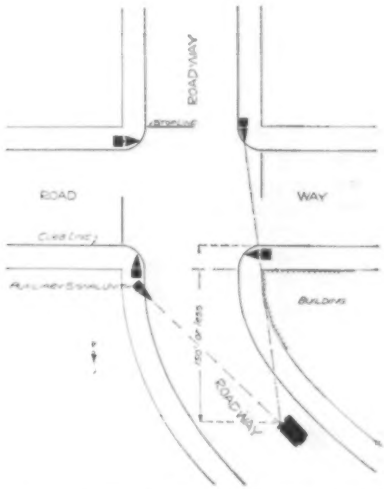
Typical installation at "T" intersection



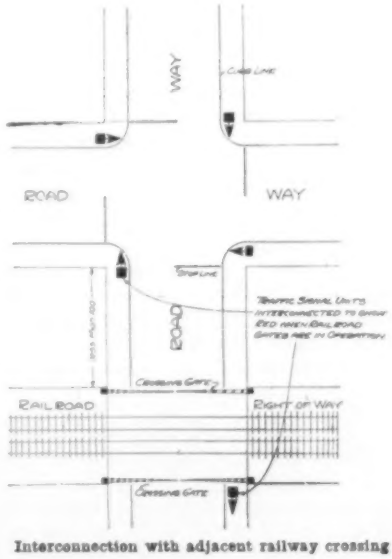
Wide intersection requiring auxiliary signal



Offset requiring auxiliary signal



Curved approach requiring auxiliary signal



Interconnection with adjacent railway crossing

STANDARD POSITIONS REQUIRED FOR SIGNAL INSTALLATIONS UNDER THE NEW MASSACHUSETTS CODE

In applying the Code to non-standard existing installations, the Massachusetts Department of Public Works has adopted the liberal policy of a tentative schedule of time limits for conversion, varying according to importance and to the availability of standard parts and of funds

Standards of Installation

In order that motorists may be guaranteed good visibility, and may know where to expect to find traffic signals at intersections, the code has specified standards which will give a uniform location and provide visibility sufficiently in advance of the intersection to permit a vehicle to stop before reaching it. The control indications of each installation are limited to vehicles within one block of said intersection.

The location chosen as standard is the far right corner. This provides for four signals at the average intersection, and instructs the motorist to expect to find all his indications upon the far right. The only exception to this location is at intersections where the street area is so large that it permits the placing of a traffic island, a location which in some instances represents the best place for control signals. When a signal is located upon the far right corner, it is usually placed at the intersection of the curb line of the street whose traffic it controls and the property line of the intersecting street. The far right corner location for traffic signals has been chosen because it can be used in the majority of intersections, because it gives the best visibility, and because, being out of the roadway proper, it does not interfere with turning movements.

The height of signals is placed at not less than 8 feet, to insure visibility over the top of the average parked car, nor more than 16 feet, to keep signals from being placed so high as to be invisible because of sun visors or the tops of cars. Wherever signals are over the roadway, they must be 14 feet 6 inches above the surface of the pavement to give clearance for trucks. The most common height will be 8 to 10 feet.

Signals must be located in every case so as to give approaching traffic a signal indication from all points up to 150 feet. This is to provide adequate braking distance for speeds up to 40 miles per hour. The code also specifies that signals shall not be more than 100 feet from the point where vehicles are expected to stop. This guarantees positive indications and prevents confusion as to whether the signal is for the approaching or the next intersection. All signals are required to be shielded in such a manner that the approaching motorist will see only the signal intended for his direction.

Standards of Operation

There are many signals of good design which are properly installed at intersections where there is a legitimate demand for them, but which are not effective because of their improper operation. In order to secure efficient operation and to provide the motorist with a consistent method of signal control with which he may easily become acquainted, the code establishes standards of operation.

The first requirement follows general railroad practice and requires that all signals must operate continuously, either as control devices (stop and go), or as warning devices (flashing yellow, or, in the case of through ways, flashing red upon the side street and flashing yellow upon the through way). In other words, there shall be no dead signals; thus whenever a motorist sees a dark signal, it will be an indication to him that the signal is out of order and that he should exercise more than ordinary caution.

The next provision requires that traffic signals may operate as control devices only when conditions warrant control, as established in standards of utility, and that at all other times they must act as warning devices, giving indications of a flashing character. The only exceptions to this are progressive systems and traffic-actuated devices, which, because they do not cause unnecessary delay, may operate continuously, regardless of how light the traffic may be. The most evident result of this requirement is that during the late hours of the night motorists will not be stopped and required to wait unnecessarily when there exists no cross traffic. Instead, they will be required by the flashing indication to cross the intersection slowly and with caution.

Since one of the greatest evils of modern traffic control signal operation is the use of excessively long time-cycles, the code establishes maximum lengths of cycle. Three classifications are established. Intersections with three or four entering ways have a maximum of 60 seconds, those with five entering ways, 80 seconds; and special intersections with unusual conditions have a maximum of 120 seconds. When a special pedestrian interval is employed, an additional 20 seconds is allowed. Periods or intervals are required to rotate in order to prevent giving one period more than once in a single cycle. Periods must always be in proportion to the amount of traffic using them. The code requires that traffic counts be taken and that the signals be timed in actual proportion to the traffic arriving upon each street.

Another common ailment among present signal operations is the use of an excessive number of periods or intervals, a practice which reduces the capacity of the intersection materially. To prevent this, the code establishes maximums. Intersections with three or four entering ways may have only two periods, those with five entering ways may have three movements, and special intersections four movements. This does not include special pedestrian periods, and when they are used, an additional interval may be allowed.

The yellow change period is required following the green signal for a period of from 3 to 5 seconds. This time is necessary to provide adequate braking distance for those who are about to stop. A change period is permitted following the red, but is not required. The yellow may be displayed either with the green as an overlap or alone. It must be displayed independently of the red or it would be confused with the special pedestrian period. Where the special pedestrian period is used, the code specifies that it shall not be longer than 20 seconds nor less than 15.

Still another of the harmful practices being used in current signal operation is that of erecting a series of adjacent installations and of not providing for any type of coordination. This means that the motorist is never sure of getting through more than one of them without being delayed. To prevent this type of operation, the code requires that whenever signals are within 2,000 feet of each other they must be coordinated. The code limits the so-called simultaneous type of coordination, which gives all green indications in the same direction at the same time, to systems of not more than two signals, on account of the fact that this system encourages speeding and is low in efficiency when compared to the other types. The limited progressive system, which gives every other indication the same color, is limited to localities where the street blocks are of equal length, and where traffic demands are approximately the same at all intersections, for, unless these conditions are present, the limited progressive systems cannot work efficiently. The flexible progressive system of coordination is permitted and recommended everywhere, since it is the most efficient method yet devised. In order to move through a whole system of coordinated signals, the motorist must drive his vehicle at the speed for which the signals are timed, and therefore the code requires that signs be erected stating that speed.

Wherever traffic signals are installed at intersections adjacent to railroad grade crossings, the code requires that the railway warning devices be interconnected with the signals in such a manner that when the warning signal indicates the approach of a train, the control signals will give traffic approaching the crossing a stop indication. In all cases a signal must be installed between approaching traffic and the grade crossing. In addition, a signal must be provided for enginemen to indicate whether or not approaching traffic has been given a stop indication.

The Effect Upon the Motorist

In summary, then, the standards set forth by the code will, from the viewpoint of the motorist, establish the following:

First.—He will not be delayed by signals installed at locations where they are not needed. Neither will he be delayed by signals operating at times of the day or night when traffic is too light to warrant control operation. In other words, the only time he will be stopped will be when there is a legitimate utility for the signal which requires him to stop.

Second.—He will be faced by uniform signals. He will know that when he finds a three-color signal he must proceed on green, wait on yellow, and stop on red, and that where a four-or-five-lens signal is provided, there are special movements involved and he must make the turns indicated by the arrows only when said arrows are illuminated. He will also know that when he finds a flashing red signal he is approaching a through way and is required to come to a full stop before entering the intersection. He will also know that whenever he sees a flashing yellow indication there is some particular hazard at that intersection and he is required to proceed with caution.

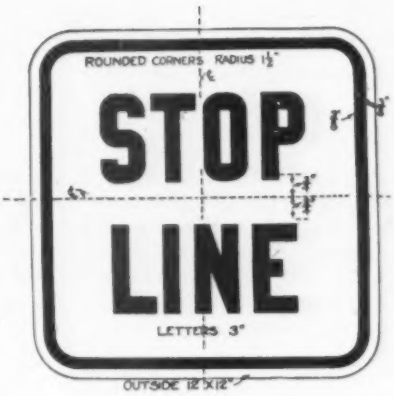
Third.—He will know that he is to expect to find his signal indication upon the far right-hand corner, and that he does not have to obey the commands which it gives until he is within one block of it. He will know that he will be able to see every signal 150 feet in advance of the intersection, and thus will be able to stop in case the indication is red. He will know that he will never be required to stop more than 100 feet away from the signal which is controlling his actions. He will also know that because of proper shielding he will be able to see only the signal intended for his direction.

Fourth.—He will know that all signals are operating continuously, and that if he finds a signal dark, it is out of order and he must exercise caution lest the traffic upon the other street shall have the green signal. He will know that the cycles are not excessively long, and that he will not be required to wait an unnecessary length of time. He will know that the street upon which he is traveling will receive its full share of the cycle. He will know that when he is proceeding upon the green, he will receive a 3-5-second warning period of yellow, so that if he is too close to the intersection to stop in safety, he may have time to cross the intersection before cross traffic is released. He will know that where he can see several signals ahead, they will be coordinated, and that if he will drive his vehicle at the speed posted on the signs, he will be able to drive right through the entire system without being required to stop. He will also know that if a railroad grade crossing is adjacent to a signalized intersection, he will be given a stop indication in the event of a train crossing the tracks.

Thus the motorist may travel from one jurisdiction to another with a knowledge that all control devices will be basically the same as those to which he is accustomed in his own locality. With this understanding, he will be in a better position to avoid accidents.

It is anticipated that the changes required by the code will be brought about gradually, only the most obviously unsatisfactory conditions being required to be changed at once. All new installations are, of course, being made in accordance with the standards. To date, the state has received the full cooperation of the cities and towns.

Advance warning sign outside of business district



top line sign

Advance sign for progressive system

Special sign for turning arrow

AUXILIARY SIGNS

Requirements for the installation at certain places of auxiliary signs are given in detail in the code. The shape and wording of these special signs are shown in the accompanying illustrations. In all four, the letters and borders are black. The background is white except in the advance warning signal, where it is yellow

New Committees of National Conference on Street and Highway Safety Now Functioning Actively Under Leadership of Secretary Lamont

ON October 10 the Committee on Measures for the Relief of Traffic Congestion (see page 87, October issue) held its first meeting in Washington. Its three subcommittees will report in January. The four main committees of the Conference, appointed by Secretary of Commerce Lamont, with their subcommittees and the Chairman of each, as thus far announced are:

I. *Protection of Railway Grade Crossings and Major Highway Intersections*—William R. Dawes, Vice-President, Central Trust Company of Illinois, Chicago

- a. Statistics—C. E. Hill, New York Central Railroad, New York
- b. Physical Hazards—Leslie Sorenson, Traffic Engineer, Chicago
- c. Signs, Signals, Markings and Other Protective Devices—Davis S. Beyer, Liberty Mutual Life Insurance Co., Boston
- d. Vehicle Operation Regulations and Methods—E. L. Cord, President, Auburn Motor Co., Auburn, Ind.

II. *Maintenance of the Motor Vehicle*—William Candler, Vice-President, Atlanta-Biltmore Hotel Co., Atlanta

- a. Faulty Vehicle Maintenance—Holger Jensen, Maryland Casualty Co., Baltimore.
- b. Technical Requirements for Proper Maintenance—L. H. Palmer, Vice-President and General Manager, Fifth Avenue Coach Co., New York
- c. Methods for Securing Proper Maintenance—Sidney J. Williams, Director, Public Safety Division, National Safety Council, Chicago

III. *Measures for the Relief of Traffic Congestion*—E. J. Mehren, Vice-President, McGraw-Hill Publishing Co., Inc., Chicago

- a. Location, Causes and Effects of Congestion—Harold S. Buttenheim, Editor, THE AMERICAN CITY, New York
- b. Remedies and Their Appropriate Application—Dr. J. Gordon McKay, Director, Cleveland Highway Research Bureau
- c. Methods of Local Procedure—Harold M. Gould, Consulting Traffic Engineer, Police Department, Detroit

IV. *Committee to Review the Uniform Vehicle Code and the Model Municipal Traffic Ordinance*—personnel to be announced

Dayton Plans a River-Front Civic Center

By CHARLTON D. PUTNAM
PRESIDENT, CITY PLAN BOARD, DAYTON, OHIO

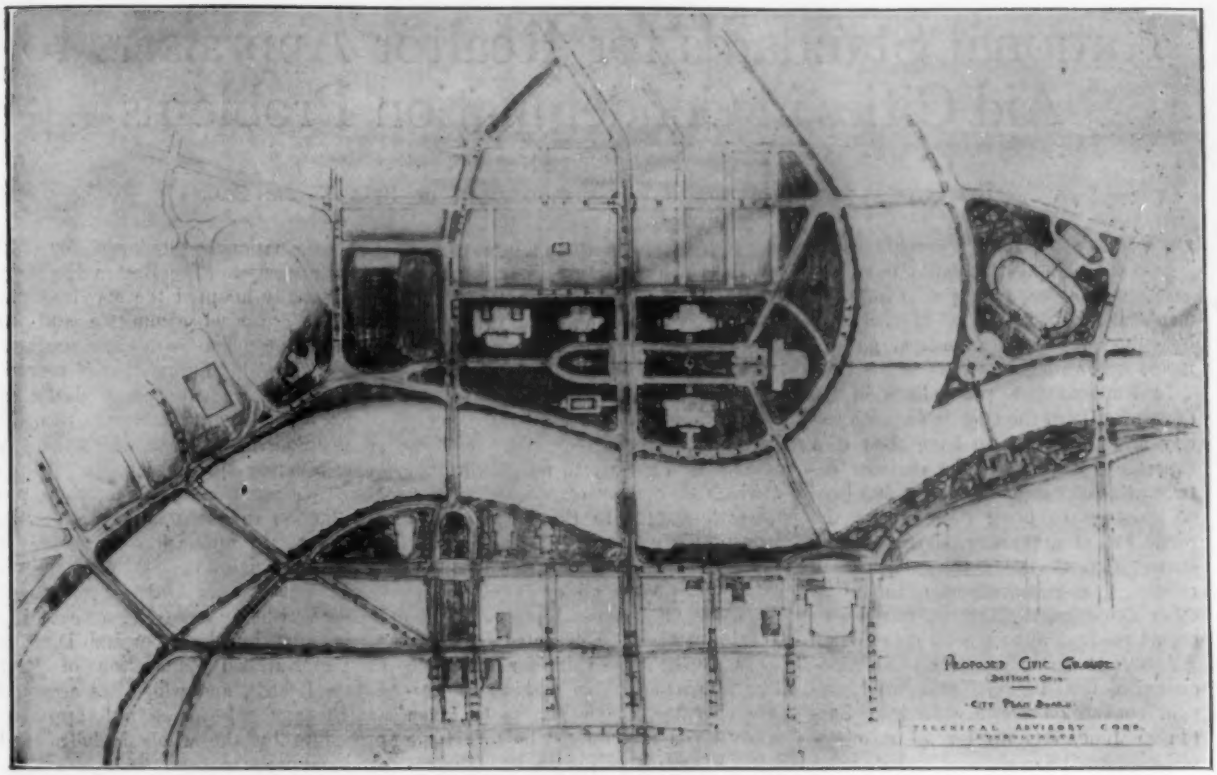
A SITUATION has arisen in Dayton, Ohio, which has brought forth from the City Plan Board a recommendation for a civic group possessing some very unusual features. At the present time, the public buildings, such as the City Building, County Building, Library and Central High School, are scattered throughout the downtown business district without any attempt at grouping. These buildings are all obsolete and overcrowded, many departments having to be housed in various office buildings. Within the next few years practically all of these buildings must be replaced by new ones. The present sites are not desirable for permanent locations, since in many cases they are too small, and in some cases they are utilizing valuable land which would much better be privately developed. The County Buildings, namely two court houses and a jail, are located at the intersection of the two main business thoroughfares. There is an old court house, constructed in 1850, of the Grecian type of architecture, which is very beautiful and in the opinion of many people is worthy of preservation.

The limits of the central business district are defined by an industrial district on the east, a railroad track on the south, and the Miami River on the west and north. In the opinion of the Plan Board, the taking of a sufficient area in this central business district for a proposed setting of the public buildings would remove from private development an area which ultimately will be needed for commercial use. Land values in this district are so high that financing such a location is almost prohibitive—certainly absolutely prohibitive if enough land were acquired for the ultimate needs of the public buildings. Therefore, the Plan Board has recommended an area just north of the business district across the Miami River. This area would center on the main north-and-south thoroughfare of the city. In this location public buildings would be easy of access from the business district, but would in no way hamper its growth. This area has commercial development on Main Street, but the rest of it is almost entirely occupied by single-family residences of an inexpensive type. There is little demand for property in this district, and consequently the increase of value over the period of time necessary for completing the civic group will be small.

To Make the Miami the Seine of Dayton

In every consideration of a site for a civic group it has been realized that the river frontage should be in the picture as prominently as possible. The Miami River is not navigable and consequently its banks are not required for industrial development. Except during a rainy season, there is comparatively little water flowing in the river; and, therefore, in order to make the river attractive at all seasons of the year, it is proposed that several collapsible dams be erected to provide for basins filling the riverbed from bank to bank. A considerable length of river frontage is already owned by the city, and parts of it have been already developed with parks. With the plan as proposed, there will be a distance of a mile and a half on the north bank of the river, opposite the

AIRPLANE VIEW SHOWING MOST OF THE AREA INCLUDED IN THE DAYTON CIVIC CENTER PROJECT



PLAN OF PROPOSED CIVIC CENTER FOR DAYTON

A perspective view of the project as it will appear when completed is shown on the front cover of this issue of The American City

business section, which would be developed with a boulevard backed up by the civic group and the existing parks. On the south bank of the river there is a half-mile stretch owned by the city. One of the factors taken into account is the location of the new Art Institute and Masonic Temple on the north bank of the river adjacent to the proposed site of the public buildings. A point of ground made by the junction of the Miami and Mad Rivers at the east end of the proposed site provides an ideal location for a municipal stadium, to be used for high school and other athletic contests. Several new bridges necessary for the relief of traffic conditions would lead from the business district to the civic group.

At the present time the land north of the river lies about twelve feet below the top of the levee. It is proposed that all the public buildings should be constructed above the level of the top of the levee, so that they will be effectively seen from the opposite bank. The area about the buildings will not be solidly filled with earth, but a substructure will be built on a considerable part of this area to provide garage and storage space. The concrete slab over this structure will be covered with sufficient earth to provide for lawns and planting. The areas about these buildings are so ample that the buildings can be readily expanded when the necessity arises.

It is proposed at the present time to locate six buildings in this area—a new Court House, a City Building, a Library, a High School, the Wright Memorial and the old Court House. One of the interesting features of this plan will be the moving of the old Court House to a site in the civic group. There is considerable sentiment attached to this building, and one of Dayton's citizens has agreed to move it at his own expense. The High School will be located adjacent to an existing park and playground, which would save the cost of purchasing land for this purpose. The sale of the present county property and the present high school property will provide sufficient funds for sites and buildings for these purposes in the group. At a later date money will have to be raised for the development of the rest of the group.

The physical conditions attaching to this site are unique, and it is believed that the development will be different from anything else attempted in this country and will compare favorably with many of the river developments of European cities. The plans were prepared by the Dayton City Plan Board, with the assistance of The Technical Advisory Corporation, of New York.

Skyscrapers—Assets or Liabilities?

THAT the skyscraper complex has spread north, south, east and west, is indicated by the zeal with which cities in these various quarters have presented figures to prove a higher rating in the number of tall buildings than was shown for them in the "Census of Skyscrapers," which was prepared by the Thompson-Starrett Co., of New York, and appeared in a brief article in THE AMERICAN CITY for September.

Two cities—Buffalo, N. Y., and Chattanooga, Tenn.—as reported last month at page 163, promptly came forward, through their chambers of commerce, to call attention to their omission; and afterwards other agencies in Birmingham, Ala., and San Francisco, Calif., protested that the figures for buildings of 10 to 20 stories should be 22 and 105, respectively, instead of 13 and 45. Atlanta, Ga., revises its figures for buildings of 10 to 20 stories, from 17 office buildings to 31 of all kinds. On the other hand, the Real Estate Board of Kansas City, Mo., gives the buildings of 10 to 20 stories as 37 instead of 60.

THE AMERICAN CITY regrets any inaccuracies in the table as published, and is glad to publish the corrections; but while it feels no opposition to architecturally good skyscrapers when full attention is given to the just requirements of the surrounding land, so that ample light and air wil be available for future as well as present structures in the vicinity, and no undue congestion of sidewalks, roadways, transit facilities and other utilities will result, it seems necessary to point out that these requirements are hardly ever fully met, and to call in question the wisdom of the present inter-city rivalry for high buildings.

National Standards for Realtor Appraisers to Aid Cities in Condemnation Problems

By HERBERT U. NELSON

EXECUTIVE SECRETARY OF THE NATIONAL ASSOCIATION OF REAL ESTATE BOARDS

THE problem of purchasing or condemning land at a fair price when needed for public improvements is admittedly one of the most difficult with which municipal governments are struggling.

In condemnation proceedings in the past it has been the custom for both the city and the owner to have their own expert appraisers, and the variance between the appraisals has sometimes been so great as to bring discredit on the whole art of appraising. We have, of course, seen the same thing happen in relation to so-called expert testimony in other fields, particularly in relation to expert medical testimony in court cases.

Action taken by the National Association of Real Estate Boards at its annual convention recently held in Boston in June, sets up for all members of the Association definite and detailed standards of practice for the appraisal of real estate. The appraisal standards of practice, approved and recommended by the Association's board of directors, and adopted by the delegate body, are expected to aid municipalities in acquiring real estate and to act as a safeguard to the public in all investments in real estate.

The statement of Standards of Practice for real estate appraisal has been formulated in such detail that it forms a 23-page pamphlet. It establishes a definition for appraisal terms. It outlines the appraiser's procedure, lays down certain ethical rules, and defines expressly procedure which, if followed, will compel the appraiser to give facts by which his conclusions may be checked. An appraisal report made in conformity with the Association's recommended procedure may be defended in a court of law as something more than an unsupported opinion.

While not mandatory, these standards of practice set up an approved procedure which appraisal committees of local real estate boards, members of the National Association, and individual realtor appraisers are recommended to follow in making appraisals. If followed, as it may confidently be expected they will be to an increasing degree as time goes on, they will inevitably tend greatly to reduce the zone in which differences of opinion can occur with respect to the value of any given property.

It cannot for a moment be assumed that appraising is an exact science in which, by mathematical processes, two appraisers might be expected to arrive at exactly the same value for any given piece of property. In making an estimate of value, the weight to be given to any given factor must be to a large degree a matter of judgment. The reliability of the appraisal will always be dependent on the personal judgment and experience of the appraiser. Moreover, since every piece of real estate is unique, the same facts will have different significance for different pieces of property.

As in the art of medical diagnosis, however, it is possible by applying certain methods of procedure and control to greatly reduce the zone of error and variation.

It is the hope of the National Association of Real Estate Boards that municipalities, banks, investment companies and the blue-sky commissions of the various states will assist the Association in obtaining acceptance and observance of the standards which it adopted at Boston.

Recent Action in Boston and Cleveland

Recent action of the Boston Real Estate Exchange illustrates the meaning for individual cities for the adoption of national standards for real estate appraisal. The Boston Exchange has formally adopted the standards for its own appraisal committee and for all its active members in their appraisal procedure. This means that if municipal officials call upon the appraisal committee of the Boston Exchange to make an appraisal of property which the city is considering purchasing, or if the Board's committee or its members are called upon to testify in condemnation procedure, the public has the assurance that the appraisal will be made in accordance with detailed standards of practice which have been carefully worked out by the Appraisal Division of the National Association of Real Estate Boards, and which are accepted as fundamental for sound appraisal procedure by the whole body of real estate appraisers.

A rather spectacular illustration of the service which can be rendered to the city officials through the setting-up of appraisals that have behind them the assurance of experienced judgment and of freedom from bias has been given recently in Cleveland, Ohio. In three recent instances the valuation committee of the Cleveland Real Estate Board has been effective in protecting the taxpayers' money in the purchase of public park and playground lands which were being bought by the city. In one instance, for example, the appraisal was made at the request of the city government in order to determine the value of a parcel of land the purchase of which was contemplated for playground development. A resolution had been sponsored by a councilman in the city council to purchase the site for $47,500. The valuation committee reported the worth of the property at $23,660. As a result of the board's appraisal the city did not purchase the property.

Massachusetts Trains Men for Highway Beautification Work

THE Department of Public Works of the state of Massachusetts is training a small army of men who, while their principal responsibilities will be lines and grades, surfaces and side drains, will be equipped with specialized knowledge of vines, shrubs, and trees, and of the esthetics of roadside development. Such training has been found essential to satisfactory results in the Department's roadside planning and planting program, according to James H. Taylor, Highway Landscape Supervisor, reporting progress thereon in a recent issue of *Public Roads*.

"Depressions in the road surfaces are known to the road maintenance man as 'pot holes,'" says Mr. Taylor. "The roadside developer detects what may be called pot holes in the highway landscape, and corrects the situation, sometimes by filling in, and sometimes by removing detracting or barrier material.

"All roadside pictures exist in three parts—foreground, middle-distance, and background," he adds. "The planter must know the dimensional limits and contrastual possibilities in shape, texture, and color; bark, leaf, and flowers. He must know the spring aspect, summer maturity, autumn glory, and winter value; in other words, he must have a complete knowledge of growing things."

Three tree crews are now kept in operation throughout the year on the Massachusetts highways, each crew consisting of a tree agent and three men. Planting, in the main, is confined to new rights-of-way, since their widths of 60 feet or more allow greater opportunity for landscaping.

Thawing Out Winter Water-Works Problems

By J. WALTER ACKERMAN
CITY MANAGER, WATERTOWN, N. Y.

A TYPICAL WINTER SCENE IN WATERTOWN, N. Y.

THE winter brings to all water-works certain problems that do not obtain during the warmer weather, and in the northern latitudes these problems are perhaps more acute than they are in the southern part of the United States. As Watertown, N. Y., is located very near the northern boundary, our problems perhaps represent more or less the maximum difficulties in the United States. In addition to the fact of its northern location, Watertown is located in a limestone region in which the outcropping is very near the surface. In the early days of water-works construction in this town, modern methods for rock excavation were not used; consequently, many of our mains are not laid at a proper depth. While we have had no trouble with the freezing of our mains, yet this fact persists in some of the older service pipes and they are too near the surface and subject to freezing. Our present practice is that all water-mains, even though laid in solid rock, have at least five feet of cover.

Thawing Services

Because of the exposed condition of many of the old service pipes and the fact that they frequently did freeze, in 1924 we had a local concern design an electrical machine for thawing these pipes. This machine uses alternating current of variable voltage and quantity, controlled by a field rheostat that operates on a separate exciter on the same shaft with the generator.

The generator is driven by a Ford engine and the whole equipment is sufficiently compact that it can be wheeled on a ¾-ton truck and readily transported to any part of the city. The range in voltage is from 0 to 75 and the range in amperes is from 0 to 500. In the ordinary ¾-inch service pipe in which the connections through the pipe and adjacent pipe and main do not exceed 300 feet, the amperes required are from 200 to 250, and it usually takes less than ten minutes after connections are made before the water begins to flow. In short lengths of pipe where there may be lead or fiber washers in some of the connections, it is usually the practice to begin the operation at a low amperage and gradually increase it after a few minutes if it does not start in order to prevent burning out such gaskets as may be in the line.

Charges for Thawing

Since these service pipes, with insufficient cover, were paid for years ago by the property owners, it is felt that it is not their fault that the pipe freezes, consequently this work is done free of charge. If we find from our records, however, that the service pipe is of sufficient depth and that the exposure is in the cellar or area-ways we then make a charge of $5.

Hydrant Inspection

As soon as the weather becomes sufficiently cold that there is a chance of water freezing in any hydrants, an inspection system is established with two men to patrol the city constantly, and a map is kept in the service department on which colored pins are used to indicate different conditions of hydrants. From the experience gained from year to year the men can usually locate those hydrants which give the most trouble.

There are some hydrants in which the drainage is so poor that there is bound to be water standing in them. This is pumped out several times by a specially designed pump, but if it continues an anti-freeze solution is made by pouring in denatured alcohol. The test consists of unscrewing the nozzle cap and dropping a plummet in to find out whether or not there is any water in the hydrant. In case a hydrant is found to be frozen, hot-water containers are taken to the job with the service truck, and the hot water is pumped in until the hydrant is thawed out. This is handled very easily.

In case the snow becomes so deep that the hydrants get covered up, another gang is sent to shovel them out so that the firemen may find them in case of fire.

In conformance with the old practice of painting hydrants red, we continue to do so, but are now painting the tops black so that in the winter time they will be more readily discovered if they are at all above the snow level.

Civic Spirit Down Cellar

TO the numerous methods of arousing public interest in fire prevention activities in and about the house, as suggested by "Hintsand Pointers" this month (page 111), an important addition has just been made by the Industrial Commission of Wisconsin in a bulletin entitled "A Safe Heating Plant."

Heating-plant defects lead, in that state, in the causes of fires. Specific defects are listed by the Commission as follows:

Defective chimneys
Woodwork against chimney walls
Burning-out of unclean chimneys
Defective stoves, boilers, furnaces and fireplaces
Stoves, boilers, and furnaces too close to woodwork
Rusted and defective smoke pipes
Smoke pipes too near unprotected woodwork
Hot-air pipes too close to woodwork
Hot-air registers not packed with asbestos
Steam pipes in contact with woodwork
Boilers, furnaces and bake ovens on wood floors
No floor protection under stoves
Smoke pipes in closets, attics, and concealed spaces
Flue holes papered over or stuffed with rags
Smoke pipes not rigidly wired or riveted
Rubbish in boiler-rooms
Ashes in wooden or cardboard containers
Ashes on wood floors or against walls of partitions
Overheating of stoves, furnaces, and boilers

Most of these heating-plant danger points are discovered readily, and the remedies are just applied common sense, says the Commission. 'Carelessness and procrastination on the part of property owners are responsible for the large heating plant loss, and the considerable loss of human life in such fires."

Gasoline Stations Become Architectural Assets

THAT the roadside gasoline station need not be an eyesore and an abomination has been proved in all parts of the country since public opinion became aroused to the point of outraged protest. But it has remained for two of the most progressive land-planning bodies in the country to demonstrate the extent to which such essential structures may be made a positive contribution to the charm of street and roadside. Architectural distinction, an attractive landscape setting, and harmony with the character of the surrounding scene, distinguish alike gasoline stations recently developed by the Westchester County, N. Y., Park Commission for the Hutchinson River Parkway, and by the City Housing Corporation, for Radburn, N. J., "the new town for the motor age." (See page 142 of this issue.)

THIS, STRANGE AS IT MAY SEEM, IS A GASOLINE FILLING STATION
It is on the Hutchinson River Parkway, of the Westchester County, N. Y., park system

On the Hutchinson River Parkway

Not long after the opening of the Hutchinson River Parkway last fall, the necessity for emergency filling stations became apparent to the Westchester County Park Commission. This eleven-mile scenic driveway extends through fields and woodlands formerly belonging to private estates. The usual uncontrolled and heterogeneous roadside stands were unable to get a foothold along its borders, because the 40-foot pavement is protected by park strips on both sides, forming a reservation having a minimum width of 200 feet and stretching out to many times that width in some parts. Fifteen to twenty motorists a day run out of gasoline on the parkway.

The architectural treatment of the buildings provided to meet this emergency is unique. The stations and their appurtenances are suggestive of New England farm buildings. One of the architects' conceptions here, as in Radburn, was that it is unnecessary to have gaudily painted iron pump standards conspicuously displayed to the public view as sign and symbol of the buildings' purpose. Here, therefore, some of the supply pumps are housed completely out of sight in the old farmhouse type of building. Others are enclosed in a stone curb surmounted by a lattice-work structure, the whole having the outward semblance of a well of water on some well-kept New England farm. The compressed-air standards are boxed-in to resemble old-fashioned hand pumps with the familiar long wooden handle. The station buildings and pumps are located well off the parkway drive, with paved entrance and exit roadways and a service area. The landscape treatment includes shrubbery that will provide an effective screening and setting when another year's growth is attained.

When a motorist runs out of gasoline anywhere on the Parkway, motorcycle patrolmen, coming to his rescue, relay calls into one of the two filling stations. The patrol station is in one of these buildings. The services furnished to the public by the emergency stations are continuous, day and night. The general arrangement of the stations was worked out by Gilmore D. Clarke, Park Commission landscape architect; and Penrose Stout, as consulting architect, designed the buildings.

A FILLING STATION AT RADBURN, N. J.

A Different Type at Radburn

The first filling station to be built at Radburn was designed by Clarence S. Stein, former Chairman of the New York State Commission of Housing and Regional Planning, and chief architect for the new town, and has just been completed. Mr. Stein gave the same careful attention to both building and layout that was given to neighboring structures of larger scale. The result is that the filling station presents itself to view as a small building of stone and stucco, with an exceptionally graceful roof-line. It occupies the southeast cor-

ner at the intersection of Plaza Road and Fair Lawn Avenue, and is set well back, with a stretch of lawn and shrubbery separating it from both roadways. The fringe of multi-colored pumps ordinarily presented to the roadside is conspicuously lacking—through a solution interestingly different from that in Westchester County. Not only pumps, but oil-distributing tanks and all other adjuncts of a service station have been placed on a platform at the rear of the building in which office and storeroom are located. Drive-in approaches lead to this platform from both roadways. Greasing-pits are still further to the rear.

The two plans, essentially different in character and in the details of their arrangements, are, as the illustrations prove, almost equally a delight and a satisfaction to the eye.

Making the Most of Accident Records

THE foundation of all accident prevention work is statistical information covering street accidents over a considerable period of time. Hawley S. Simpson, Traffic Engineer of Essex County, N. J., declared in a paper entitled "Cashing-in on Traffic Accident Records," which he read in Chicago last month before the Eighteenth Annual Safety Congress.

Such information must be carefully collected, carefully compiled and most carefully analyzed, the speaker said. He mentioned that the National Safety Council has devoted a considerable portion of its resources and the time of its field and office forces to this work and has established what is known as the Standard Accident Reporting System.

The enthusiasm of most American communities in attacking this problem, however, usually extends only to a good beginning in the collection of statistics, according to Mr. Simpson. He has found that their interest fails to carry them through the more important work, involving the use and study of that which has been collected, so that definite results may be accomplished in pointing out ways by which accidents may be prevented. In other words, he contends that there is no superstructure on the foundation. The research work and the compilation of reports prove of real value only when the facts and lessons which they offer are properly understood and acted upon. In this connection Mr. Simpson makes the following statements:

The Engineering Aspect of the Problem Neglected

"The major element of neglect has entered from the engineering standpoint more pointedly than from any other angle. Little is known concerning the actual degree of safety afforded under various conditions by traffic signals and little of definite value concerning the stop street regulations. Little is known also of the effect on safety of various types of curb parking, of the effect of parking near intersections, of the effect of large or small curb radii, of the effect of street lighting, of parking on narrow streets, of traffic circles, of protected safety zones, and so on *ad infinitum*. It is this field to which I refer as being barely touched, yet one which offers unlimited possibilities.

How a Bureau of Public Accident Prevention Might Operate

"Accident prevention will necessarily become a specialized municipal function, and in the not far distant future. All accident prevention work, of both an engineering and an educational character, should be conducted by a division of the local police department, which might very properly be called the 'Bureau of Public Accident Prevention.' This bureau should be directed by an able man of executive and organizing ability, initiative, resource and personal magnetism.

"This bureau should be given sole and complete charge of the accident reporting system, filing, tabulating, analyzing and investigating of all accidents, as reported on the standard forms by policemen or citizens. The major efforts of the bureau should be devoted to the analysis of the reports, the preparation of charts and diagrams showing the existing conditions, and the preparation and submission of reports suggesting changes which, in the light of their investigations, seem to be practical. In order that the work of the bureau may not be nullified through petty jealousies and the involved red tape typical of semi-military organizations, it is further essential that the bureau director report to, and be responsible only to, the highest ranking authority in the police department, whether it be the commissioner or the chief, and not responsible, except in an indirect and advisory capacity, to the official holding the position similar to director of traffic. In short, the Director of the Bureau of Public Accident Prevention and the Director of Traffic should be of equal rank and authority. Otherwise, the bureau may become lost in a maze from which it will never extricate itself. Its importance is such that every effort should be extended to permit the bureau to function to the fullest possible degree."

Use of Pin Maps

Analyzing accident records, field surveys and studies of intersections at which accidents are prevalent will produce the quickest and most satisfactory results, rather than simply a study of accident statistics in general, asserts Mr. Simpson. One of the most effective ways in which this may be accomplished, he points out, is through the use of spot or pin maps which show by colored or variously shaped pins, the type of accident at each particular location. Before this sort of record has been long kept, what Mr. Simpson terms "sore points," where the frequency of the accidents is high, will begin to appear, and then the real work of the bureau begins. He would have these intersections listed in the order of their seriousness and a special record kept for each intersection, in which the details of each accident are given, as well as the approximate loss in each instance. Following this part of the program should come the detailed analysis of accidents, which should be studied and grouped in every possible manner, such as by hours, directions, type, month, day, age of pedestrians involved, etc. And upon the study of these analyses should be based, in Mr. Simpson's opinion, the recommendations, which may range from the mere trimming of trees or shrubs to a complete reconstruction of the intersection; the placing of traffic signals; the installation of warning signs; changes in parking regulations; the stationing of patrolmen at certain points during certain hours, the re-routing of school children, the relocation of street lights, and many other possible changes.

"Following the introduction of the recommended change or changes, the accident record of the intersection should continue to be kept and compared with the record preceding the change. A valuable method of more general accident analysis is to select a large number of intersections which are shown on the spot map as being extra-hazardous and to group these by areas, and then compare one area against the rest, taking into consideration the probability of accident occurrence.

"Do not let it be thought that these suggestions are intended as any solution of the traffic problem. There is none and there probably never will be one, but there are ways in which the situation may be alleviated. Continuation and improvement of enforcement activities and educational work are of great importance. In the field of engineering activities, I feel that there is the greatest room for improvement. A recent analysis of the psychology of motor-vehicle accidents showed that 40 per cent were due to improper engineering and the use of improper traffic signals. Whether this is correct or not, engineering has a large bearing upon the accident problem. Analysis of accident records should indicate methods by which engineers can cooperate with public safety officials in efforts tending to decrease accidents. But to be effective, accident records must be used, used to the nth degree, not merely filed."

Automobile Parking Machine Developed

A UNIQUE type of automobile storage machine which may help to remove the objections of merchants to the prohibition of parking on downtown streets, has been developed by engineers of the Westinghouse Electric & Manufacturing Co.

Entering this new parking garage, a motorist can drive his car onto a platform, pull a lever and obtain a check, and the car is automatically whisked upward out of sight. The device immediately places another empty platform at ground level, ready for another car.

When ready to leave, the motorist can push a button corresponding to his check, and his car is delivered to him at ground level almost immediately.

This new automobile parking machine occupies a ground space equal to that of only a small private double garage, and, according to H. D. James, the engineer who had charge of the development, can be built for almost any capacity into old or new buildings, or alone.

The machine consists of two endless chains passing over wheels at the top and bottom. Platforms are suspended between these chains. Each platform provides space for one automobile. The housing for the machine is unique because it has no floors. The automobile remains parked on the machine until called for. To quote Mr. James:

"With such devices built into office buildings, hotels, theaters and public buildings, and set up at convenient locations on vacant lots, downtown streets could be kept cleared of parked cars and made safer for moving traffic.

"Americans constantly are paying more attention to traffic conditions, and the time is coming soon when each building must care for the automobiles of its tenants as well as for the tenants themselves. The building of parking machines into apartment houses would solve the garage problem in congested apartment house districts. They could also be erected at frequent intervals in residential neighborhoods.

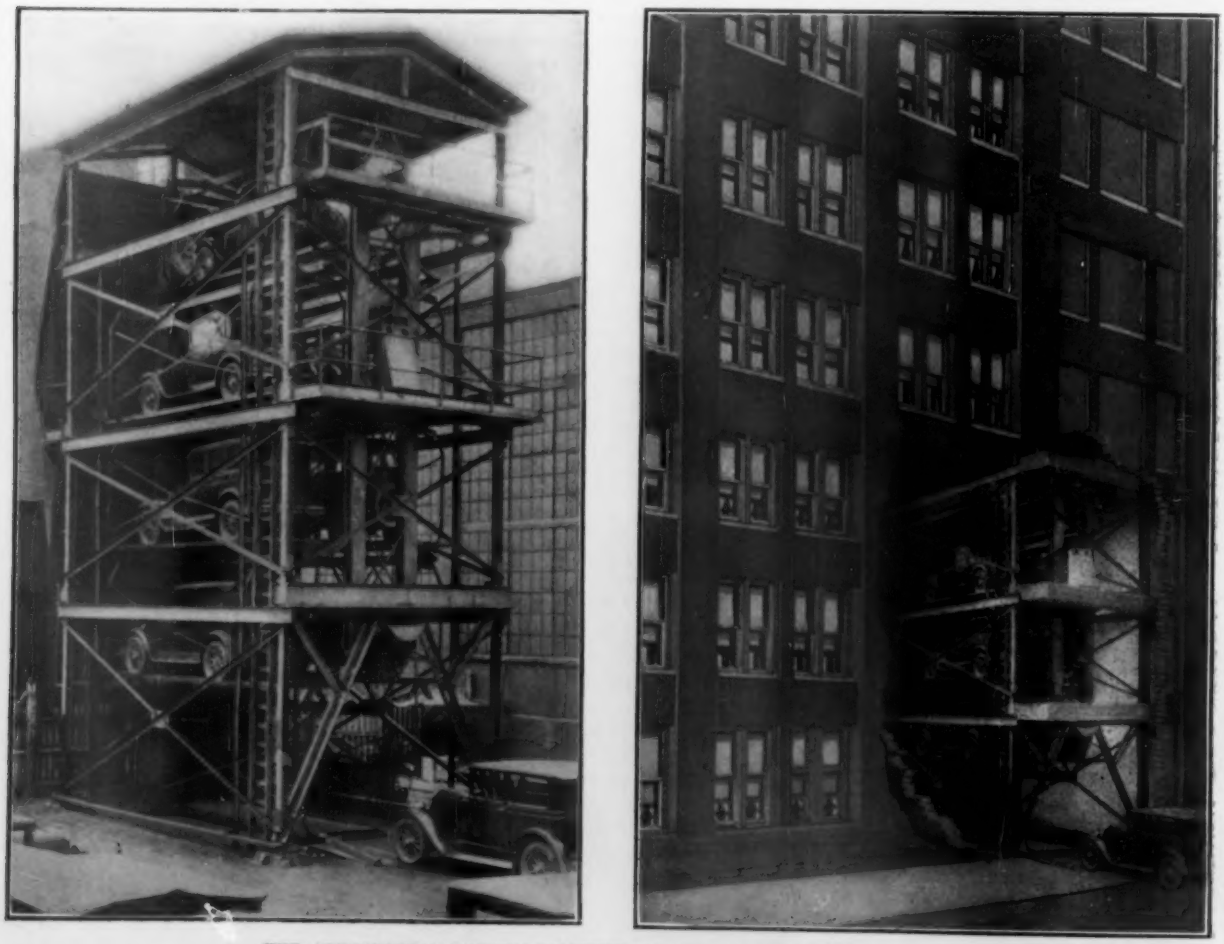
"A battery of automobile parking machines built into a theater or store building would permit motorists to drive from their homes directly into the theater or store and park their cars without exposing themselves to the weather.

"By use of the parking machines, taxing districts could save considerable money now spent in the widening of streets. By eliminating curb parking through the use of the machines, existing streets in most cases would be wide enough to accommodate moving traffic."

An important feature of the new device is that it can be equipped to operate by placing a coin in a slot, thereby doing away with the necessity for attendants. Several machines could be connected by telephone to a central office, and could be quickly serviced.

Street cars could be parked at strategic centers on heavier machines of similar construction, for use when wanted during rush hours. In large cities, much rush-hour traffic now consists of empty street cars en route to loading points.

Cruising taxicabs could be eliminated, as machine taxi stands could be established at frequent intervals. The new devices, the engineers also suggest, would make excellent bus terminals.



THE AUTOMOBILE PARKING MACHINE IN ACTUAL AND PROPOSED USE

At the left is one of four stories, holding eight cars, installed at the East Pittsburgh works of the Westinghouse Electric & Manufacturing Co. One automobile is shown ready to be driven into an empty stall. At the right is indicated a proposed method of installation in an apartment house

How 73 Cities Are Tackling the Snow Problem

A Summary of Reports from Municipal Officials in Charge of Snow Removal—Part I

Andover, Mass.

This is a town of 12,000 population, situated on the south side of the Merrimac Valley, with a total of 75 miles of streets to be kept clear of snow, 2 per cent of which are in the business section of the town.

Ann Arbor, Mich.

Ann Arbor, on the Huron River, 38 miles west of Detroit, has a population of 30,000. The appropriation for snow removal for the winter of 1928-29 was $2,000, and for 1929-30 this has been increased to $4,000. There are three or four miles of streets to be cleared, all in the business district.

Ashland, Ohio

This city in northern Ohio has a population of 12,000. The snow-removal appropriation for both 1928-29 and 1929-30 was $2,000 for clearing one mile of street in the business section.

Beloit, Wis.

The population of Beloit, which is situated on the southern boundary of Wisconsin, 91 miles northwest of Chicago, is 26,000. The 1929 appropriation was $6,300. The 1930 appropriation has not as yet been made. Beloit has a total of 80 miles of streets to be kept clear of snow, 1.5 per cent being business streets and the remainder residential.

Bergenfield, N. J.

This city of 10,000 population, in northern New Jersey, had an appropriation for 1928-29 of $31,500. The appropriation for 1929-30 has not yet been made. There are 49 miles of streets to be cleared, 30 per cent business streets and 70 per cent residential. The town uses a Fordson crawler type tractor, a 2½-ton Reo truck and a Ford truck for snow removal, and has just purchased an Aeroil asphalt burner truck.

Berlin, N. H.

Berlin, in the northern part of New Hampshire on the Androscoggin River, has a population of 20,000. The snow removal for its 40 miles of streets, including 5 per cent of the business streets and 35 per cent of the residential streets, is paid for out of the general maintenance fund.

Caldwell, N. J.

The population of this borough in northern New Jersey is 6,000 and the appropriation for snow removal for the winters of 1928-29 and 1929-30 was $2,000 a year. About one-half mile of street in the business district is kept clear of snow and the borough plows 13 miles of snow from curb to curb. In 1927, the borough bought a snow-loading machine.

Carlisle, Pa.

With a population of 16,000, Carlisle, situated in the central part of the Cumberland Valley, appropriates $1,000 a year for clearing its 20 miles of streets, 25 per cent of which is in the business section.

The Yearly Toll in the Snow Belt

Great cities and small towns prepare to combat the inroads of snow. It is expensive to keep streets open, but it is vastly more expensive to have business stunted and health endangered by the inability of automobiles to use the clogged roads.

Chicago, Ill.

Chicago has a population of 3,215,000. The temperature here is much affected by Lake Michigan, and changes of 20 degrees in 24 hours are common. During the winter of 1928-29 snow removal cost $278,000, while for 1929-30 the cost will be paid out of the street-cleaning fund. The city has 1,800 miles of streets to clear, 12 per cent business streets and the remainder residential thoroughfares.

Cicero, Ill.

With a population of 82,000, Cicero clears 10 miles of streets, 75 per cent of which are in the business district and 25 per cent are residential streets.

Columbus, Ohio

Columbus, near the center of the state, has a population of 300,000. Snow is cleared from approximately 30 miles of streets in the business section of the city only, the cost being taken from the street-cleaning appropriation. High Street, the principal business thoroughfare, is 100 feet wide, and Broad Street, a residential street, is 120 feet wide.

Concord, Mass.

The population of this town, which is 20 miles northwest of Boston, is 7,000, and the annual appropriation for snow removal for both 1928-29 and 1929-30 was $4,000. There are 61 miles of streets in Concord to be cleared of snow, of which 2 per cent are business streets and 50 per cent are residential streets, the rest being farm districts.

Cuyahoga Falls, Ohio

With a population of 18,000, Cuyahoga Falls, in northeastern Ohio, has 20 miles of streets to be kept clear of snow, 5 per cent in the business district and 95 per cent in the residential part of the city.

East Orange, N. J.

This city in northeastern New Jersey, adjoining Newark, has a population of 70,000. No separate appropriation has been made for snow removal, the expense being paid out of the general street-cleaning appropriation of $244,000. Sixty miles of streets are kept clear of snow, 5 per cent in the business section and the remainder in the residential part of the city.

Endicott, N. Y.

Endicott, near the southern border of New York State, has a population of 18,000 and an annual appropriation for snow removal of $1,000 to clear 1½ miles of streets in the business section and plow snow to gutters on 12 miles of residential streets.

Escanaba, Mich.

The population of Escanaba, which is situated on the Upper Peninsula, is 16,000 and the annual appropriation for snow removal for both 1928-29 and 1929-30 was $7,500. There are 50 miles of streets to be cleared of snow; from 5 per cent of these, in the business section, the snow is removed, and the rest, in the residential section, are plowed.

Fort Dodge, Iowa

This city on the Des Moines River, 85 miles northwest of the city of Des Moines, has a population of 26,000 and 50 miles of streets to be kept clear of snow, 40 per cent business streets and the remainder residential. The city uses a 1½-ton truck with snow-plow attached and a Fordson tractor with Baker snow-plow.

Freeland, Pa.

This borough is located on Green Mountain in eastern Pennsylvania, nearly 2,000 feet above sea-level, and has a population of 8,000. With an annual appropriation of $1,200 for snow removal, the borough clears 17 miles of streets, 40 per cent being business streets and 60 per cent residential.

Gardiner, Maine

Gardiner is situated at the confluence of the Cobbosseecontee River with the Kennebec River only a few feet above sea-level. With a population of 5,475, this city has an annual snow-removal appropriation of $3,000 to be used in clearing 14 miles of city streets and 15 miles of state roads. Twenty-five per cent of this work is done in the business section and the remainder in the residential part of the city.

Grand Forks, N. Dak.

This city is 80 miles north of Fargo, on the eastern border of the state, and has a population of approximately 17,000. The snow-removal appropriation in 1928-29 was $3,000. For 1929-30 it has been reduced to $2,000. About 60 miles of street have to be cleared, 25 per cent of which are business streets and the remainder residential.

Great Barrington, Mass.

The village of Great Barrington, in the Berkshire Hills in the western part of Massachusetts, has a population of 6,500. For 1928-29 it had a snow-removal appropriation of $5,000 to clear 54 miles of streets, mostly in the residential part of the village.

Harvey, Ill.

This residential suburb of Chicago has a population of 20,000. Wagons and trucks are used to remove the snow from 6 miles of streets, of which 25 per cent are business streets and the remainder residential.

Hastings, Mich.

Hastings is the center and produce market of a large farming region in the southern part of Michigan. It has a population of 6,000 and 3 miles of streets to be kept clear of snow. About 25 per cent of this distance is in the business section, the remainder being residential.

Highland Park, Mich.

This city is located in the southern part of Michigan just north of Detroit and has a population of 80,000. The 1928-29 appropriation for snow removal was $12,000, which was reduced in 1929-30 to $10,000 for clearing 4 miles of streets in the business district.

Hoquiam, Wash.

Hoquiam's population is 15,000. The fall of snow in this city on the Pacific Ocean is very light. In 1929 only one light snowfall was cleared from the walks, with a Fordson-equipped rotary broom, at a total cost of $50 for labor, oil and grease.

Hudson, N. Y.

This city is about 114 miles north of New York City on the Hudson River and has a population of 13,000. During the winter of 1928-29, $1,167.42 was spent for snow removal, the 1929-30 appropriation being $1,200. The city clears 1¼ miles of streets in the business section and also clears all crosswalks, hydrants and catch-basins. About 80 per cent of the work done is in the business district of the city.

Johnson City, N. Y.

This city of 14,000 near Binghamton, N. Y., makes no appropriation for snow removal from its 25 miles of streets. Twenty-five per cent of the work done is in the business section and the remainder in the residential part of the city.

Johnstown, N. Y.

This city in central New York State has a population of 11,000 and an annual appropriation for snow removal of $2,000. Five miles of business streets and 33 miles of residential thoroughfares are kept clear of snow during the winter.

Kankakee, Ill.

This city in the northeastern part of Illinois has a population of 22,000. All expense for snow removal is taken from the street and alley fund. The city has 80 miles of streets to be kept clear of snow, including 20 per cent of the business district and 60 per cent of the residential streets. The city uses eight plows, four trucks and five dump-wagons in this work.

Kenosha, Wis.

Kenosha is situated on a level prairie on the southwest shore of Lake Michigan and has a population of 59,000. For 1928-29 the snow-removal appropriation was $7,000. The appropriation for 1929-30 has not yet been made. On only 2 miles of streets in the business district is the snow entirely removed, but about 141 miles throughout the city are plowed wherever it is deemed necessary. In the residential section of the city only the crosswalks are entirely cleared.

Lackawanna, N. Y.

This city is located on Lake Erie just south of Buffalo. With a population of 23,000, Lackawanna makes an annual appropriation of $7,500 for snow removal. Of the 35 miles of streets kept clear of snow, 30 per cent are business streets and 70 per cent residential.

Lansing, Mich.

This is a city of 101,000 population in south central Michigan. The 1928-29 appropriation of $4,000 was entirely too small and it is expected that the appropriation of $5,000 for 1929-30 will also be inadequate. The city has 196 miles of streets to keep clear of snow, only 8 per cent of which are in the business section, as most of the downtown business section is kept clear by the occupants of the buildings. Last year the city purchased four motor tractors for this work.

Lebanon, Pa.

Lebanon is situated in the Lebanon Valley in eastern Pennsylvania, about 25 miles east of Harrisburg, and has a population of 25,000. The annual appropriation for street cleaning, which includes snow removal, is $7,500. Snow is cleared from the business districts and from crossings in residential districts where necessary. The merchants and the trolley company help pay the cost of snow removal.

Lewistown, Pa.

This city in central Pennsylvania has a population of 15,000. About 15 per cent of the work of snow removal is done in the business district and about 85 per cent in the residential section.

Meadville, Pa.

This city in the northwestern part of Pennsylvania is about 30 miles from Lake Erie and has a population of 16,000. There is no definite appropriation made for street cleaning, the work of clearing two miles of streets in the business section being paid for out of the street-cleaning appropriation.

Medford, Mass.

With a population of 59,000, this manufacturing city, 5 miles northwest of Boston, appropriated $14,000 for snow removal in 1928-29 and it is expected that the appropriation for 1929-30 will be $20,000. Of the 117 miles of streets to be cleared, 7 per cent are in the business district, 63 per cent in the residential district and 30 per cent in parks. The city hopes to purchase a snow loader this year.

Moberly, Mo.

Moberly is located in the north central part of the state and has a population of 16,000. About 20 miles of streets are cleared, 20 per cent of the work being done in the business section and the remainder in the residential part of the city.

Neenah, Wis.

Neenah, on Lake Winnebago in eastern Wisconsin, has a population of 8,500. The 1928-29 appropriation for snow removal was $1,900. The 1929-30 appropriation has not yet been determined. Neenah clears all its streets, comprising one mile in the business section and 59 miles of residential streets.

The reports from the remaining 35 cities will appear in the December issue.

$30,000 Saved from the Garbage Can

By HARRY A. KLUEGEL
CITY MANAGER, SACRAMENTO, CALIF.

THE Municipal Garbage Department of Sacramento makes a profit and renders adequate service to the householders without losing sight of sanitation and economy and expediency. The Department had a net income of $44,000 for 1928, and the income for 1929 will be $74,000—an increase of $30,000. From this income, $25,000 will be deducted for maintenance and operation of the city incinerator, the remainder being used to retire bonded indebtedness.

The state capital of California, with a population today of 110,000, has witnessed an increase of 45,000 inhabitants in nine years. This fact, coupled with the consequent increase in wastes, has of necessity made earlier methods obsolete, and has brought garbage collection and disposal into the engineering phase of municipal housekeeping, where it should have been placed long ago. Modern civic pride and public health require that garbage be removed rapidly and efficiently and disposed of in such manner as not to become a nuisance.

This year's income of the Garbage Department is the result of a thorough preliminary survey, and the reorganization of equipment, routing, personnel, and the additional revenues derived from the sale of waste paper, and of wet garbage for hog-feeding.

Reorganization and Present Operation

The reorganization began in October, 1928, when an investigation of the Department and its needs was made, followed by the appointment of the present superintendent, on November 11, 1928. There was complete motorization in January, 1929, and the consummation of a contract for the sale of waste paper on April 1, 1929.

The Municipal Garbage Department is operated under a city ordinance providing for the collection and disposal of wastes, and the fees to be paid for garbage collection.

The three divisions that make up the Department are: (1) Supervision and Records; (2) Bill Collections; and (3) Garbage and Rubbish Collections. The first comprises the office personnel, the second consists of four bill collectors and an adjuster, and the last is made up of one foreman, one inspector, one machinist and fifty garbage collectors. All the departmental employees, with the exception of the superintendent, are under civil service regulations.

Prior to December 1, 1928, a billing for services was made at the end of each month. This practice was discontinued and, beginning on the date mentioned, bills were issued and made payable in advance. Incidentally, these bills are among the lowest in the country. It was deemed necessary to make this change in order to minimize the losses due to removal of patrons from the city or to another section, as well as to effect a prompt payment of bills.

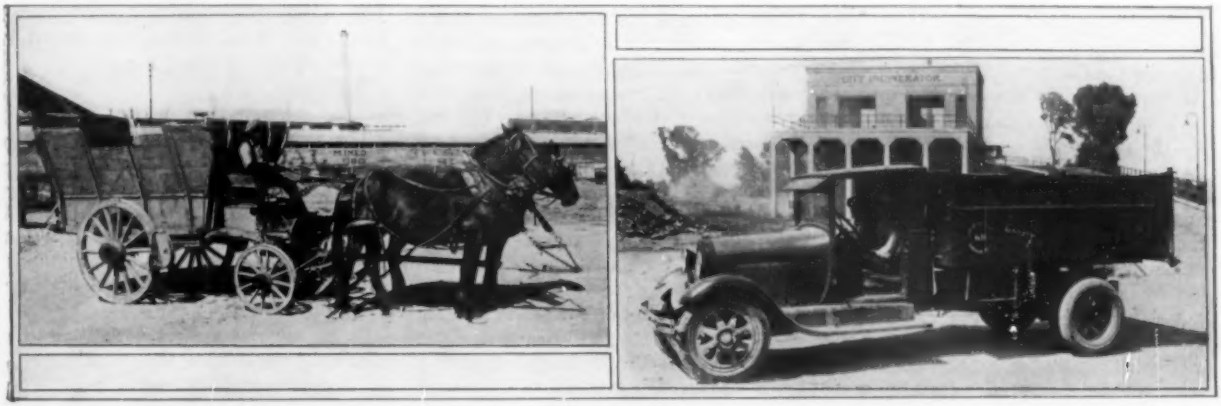
Before November 1, 1928, the Garbage Department was receiving a refund from the General Fund to cover the sum represented by uncollectable accounts. This practice was discontinued, and at present such accounts are carried and every effort made to collect on them. On December 1, 1928, money owed the Department amounted to $23,460.50. By abolishing old practices and issuing bills in advance, this amount had been reduced to $15,438.25 by July 1, 1929.

The service functions of the Garbage Department are (1) house treatment, (2) collections, (3) final disposal of the collected material.

House Treatment

Treatment of garbage by householders is of great importance, and it is vital that they follow the regulations and suggestions of the Garbage Department if there is to be the cooperation that makes for adequate and smooth-running service. Some of the more salient features of these regulations, copies of which are mailed to all customers, are as follows:

1. The occupant of each house is required by law to provide regulation garbage cans, with close-fitting covers.
2. Cans must be placed in an accessible place, and when filthy, leaking, or in any way defective be replaced by new cans. A 20-gallon size is recommended.
3. It is suggested, for sanitary reasons and the reduction of the costs of incineration, that garbage be drained of all moisture and wrapped in paper before being placed in the cans. This will, in addition, prevent the attraction of flies and the prevalence of bad odors.
4. All garbage, ashes, cans, bottles, floor sweepings, and other refuse that will burn should be placed in the can.
5. All newspapers and waste papers should be placed beside the can.
6. Cans containing water, slop, dirt, plaster, or concrete will be emptied only on special call.
7. The office must be advised five days in advance of any change in address or desire for change in service.



THE TYPE OF GARBAGE WAGON FORMERLY USED IN SACRAMENTO, AND THE MOTOR TRUCK WHICH REPLACED THE WAGON

Collection

Prior to the complete motorization program three types of equipment were used in garbage collection, namely: (1) nine horse-drawn vehicles, two horses each, with a dump-body capacity of 5 cubic yards; the city owned the wagons and hired the horses and drivers; (2) three Standard trucks with a dump-body

CLEANING A GARBAGE COLLECTION TRUCK WITH A STREAM OF HIGH-PRESSURE WATER AT THE DISINFECTING PLANT IN THE CITY CORPORATION YARD AT SACRAMENTO

capacity of 7½ cubic yards; (3) ten "Model T" Ford trucks with a dump-body capacity of 3 cubic yards.

A snap team, consisting of two horses and a driver, was also maintained at the city incinerator to assist the horse-drawn vehicles up the ramp to the incinerator. All horses used by the Department were contracted for on a month-to-month basis, the rate for each horse being $33 per month.

Since collection is the most important, and likewise the most costly, function of the Garbage Department, a study was made of the costs involved, influenced by the expense of house-to-house collection, and the cost of the haul to the place of final disposal. These figures had increased rapidly of late years on account of the rise in the costs of horse hire, grain, hay, bedding and labor. A study was then made of the budget allowance for this branch of the service, and it was finally decided that in order to secure greater efficiency and economy the horse-drawn equipment must be replaced by motor-driven. With the recent advance in motor-vehicle construction, it was only natural that the removal of wastes by motor trucks would be more economical. Daily equipment records, now being kept, clearly demonstrate the sagacity of the change that was finally made to motor trucks.

Automotive equipment was purchased and the collection routes reduced from twenty-four to eighteen. The replacement also made it possible to retire three old Ford trucks from service—still available for emergency purposes. This arrangement also eliminated from the payroll five garbage collectors, effecting an annual saving in wages of $6,855. The snap team and driver, no longer needed, were eliminated—saving $1,381 per year, a total annual saving of $8,236.

The waste collected consists of garbage, rubbish, and ashes. Collections are made six times a week in the business districts and twice a week in the residential districts. The ashes and garbage are mixed, the ashes absorbing the liquids of the garbage. Odor is eliminated to a certain extent, the fly problem is greatly reduced, and collections can be made less frequently. In this work every effort is made to control odor and dust. The wet garbage in hotels and restaurants is kept separate and taken directly to the hog farm.

The waste is transported in trucks with watertight steel tank bodies of 6 cubic yards capacity, which are constructed so as to be easily cleaned and flushed. The interior surface is smooth, and rounded edges permit easy washing. The bodies are of low height, so that a collector can empty cans into them with ease, thus minimizing the strains common to the occupation. Tarpaulins have been found to be the most efficient covers to prevent the spread of odors and loose garbage. A tarpaulin cover is costly, wears out quickly, and grows dirty easily, but it does not rattle, and permits the expansion of loads during periods when the amount of garbage is at a maximum. Steel and wooden covers are built in sections, but wear loose, get broken, and are noisy and heavy. The bodies are dumped by means of a power hoist, which causes the body to rise in the front, dumping the garbage out through a tail-gate in the rear.

At the close of each day the trucks are thoroughly washed, cleaned, and disinfected at the disinfecting plant maintained at the city corporation yard. This plant consists of a large enclosed sump and tank and hose equipment with a 350-pound pressure. The trucks—four at a time—are placed in this plant and cleaned with the high-pressure hose. When they come out, they are spick and span and the disinfectant has killed all of the germs that have been present in the trucks.

Concise daily reports are kept for the various routes, showing at a glance the number of houses visited, number of calls, kinds of refuse collected, complaints and their reasons, payments for service, operating costs, etc.

Disposal of Wastes

The prime requisites in garbage disposal are sanitation, economy and expediency. The methods of disposal are divided into those of recovery, in which there is an actual profit that pays for the cost of the process, and the methods of destruction, in which there is little or no profit involved.

Of all the wastes, wet garbage is the most valuable, as it contains food materials used with profit in feeding hogs. The disposal of garbage by feeding to animals is considered one of the proper and scientific methods of disposal—75 to 100 hogs will eat, on an average, a ton a day. The fact that disease may spread as the

WASTE PAPER ACCUMULATED DURING REFUSE COLLECTION BEING DELIVERED TO A WASTE PAPER DEALER'S TRUCK IN SACRAMENTO

THE SACRAMENTO INCINERATOR

result of such feeding appears to be unfounded, since garbage-fed hogs are as healthy as other hogs. Much of this criticism is really directed against poor management rather than any defects in the system itself.

Sacramento has a ten-year contract with the Sacramento Hog Co., which purchases wet garbage for hog feed at $2.75 per ton. The company operates a hog farm ten miles east of the City Hall, in a thinly populated section of Sacramento County. The company and its farm are under the strict sanitary regulations of the city, and the management is in the hands of the Garbage Department. At this farm, where a modern plant has just been completed, there are between 2,000 and 3,000 hogs of high grade, a fine herd of Maltese boars having been imported for breeding purposes. The entire plant is under constant municipal supervision and is thoroughly cleaned daily.

Dry garbage is incinerated at the city incinerator, which is located on the northern outskirts of the city, and has a capacity of 15 tons per hour. There is some salvaging in connection with incineration, a small combustible dump being maintained for this purpose.

Then there is disposal by land filling at the 24th Street non-combustible dump. This represents a return, in that the rubbish is being used to fill in low land and provide an extension at grade for North "A" Street.

An excellent source of revenue is now being realized in the sale of waste paper by the city to the Independent Paper Stock Co., of Sacramento. On April 1, 1929, the city took over the sale of waste paper, which had formerly been in the hands of the Standard Garbage Men's Association, composed of the garbage collectors employed by the city. This change in policy corrected a great evil, for the men were so busy with their own "private" paper business that they neglected their duties as city employees. To compensate them in part for taking away this business, the city granted each collector a wage increase of 25 cents per day.

Since April 1 the sale of waste paper has poured into the city coffers over $1,150 each month, so it is no exaggeration to state that this will bring the local government an annual revenue upwards of $13,500. It will amount to $10,000 this year, as the sale was not started until the first three months of the current year had passed. Last year only $588.90 was realized by the city from the sale of waste paper. Under the present régime there is an average sale of 225 tons per month at $5.25 per ton, and 1,000 pounds more per day is being collected than in 1928.

Complete Motorization

In order to arrive at a practical solution for replacing the horse-drawn equipment, a study, already mentioned in this article, was made of various types of equipment then in operation in the Garbage Department.

The type A. A. Ford truck, equipped as follows, was selected as the most suitable type:

Cabs, Ford dual high transmission, low-speed worm drive, Pierce Model A. A. truck governors, Rowe 20-inch extension frames, W. & K. web steel wheels (dual wheels in the rear, and single wheels in front).

Tire equipment for each truck consists of seven 8-ply heavy-duty 30 x 5 truck tires.

The bodies of the trucks are 3¾ x 6 rear-end dump, with underbody two-speed hand hoist, dimensions as follows: 9 feet long, 6 feet wide, forward end 3 feet high, rear end 3 feet high, 22-inch sides with rolled edges (provision for 14 x 2-foot side board). The material used in the construction of the body is No. 10 gage steel.

The cost of the new equipment had to be seriously considered, and the following items allowed in the current budget were taken as the basis for the purchase of eight Ford A.A. truck units:

1928 allowance for horse hire	$13,860
1928 allowance for barn man	1,551
Total 1928 budget allowance	15,411
Eight Ford truck units at $1,394.75	11,158
Allowance for oil and gasoline	1,632
Total	$12,790
Leaving a total available for repairs, tires, replacements for the eight trucks	$ 2,621

Savings and Increased Revenues

Thus the funds for the eight new Ford trucks were obtained by diverting $15,411 included in the 1928 budget for horse hire and a barn man. The balance between the actual cost of the trucks and the budget allowance will adequately meet the year's expenses for gasoline, oil, tires, repairs, and replacements. In other words, the Department, instead of writing off in horse hire the sum of $13,860, will have operated its truck and actually acquired a capital investment valued at the end of the year at $9,000. The total savings from the organization and the purchase of new trucks will give $8,236 in payroll reductions and $9,000 new assets in equipment, or a total saving of $17,236.

Added to this is the new revenue from waste paper, which, as stated, will approximate $10,000 for the current year. This and various economies, and the revenue from hog feed, increase the Department's net revenue $30,000 over that of last year. A further added revenue of about $6,000 annually is now established by a careful check of all services in the city with the billing records.

NET REVENUES—1921-1929

1921	$21,620.72	(loss)	1926	$21,194.92	(profit)
1922	10,872.93	"	1927	31,869.05	"
1923	5,677.42	(profit)	1928	44,824.17	"
1924	9,115.29	"	1929	74,000.00	(est'd)
1925	16,319.06	"			

Conclusion

Today we are trying to stress the following points in the operation of the Sacramento Municipal Garbage Department:

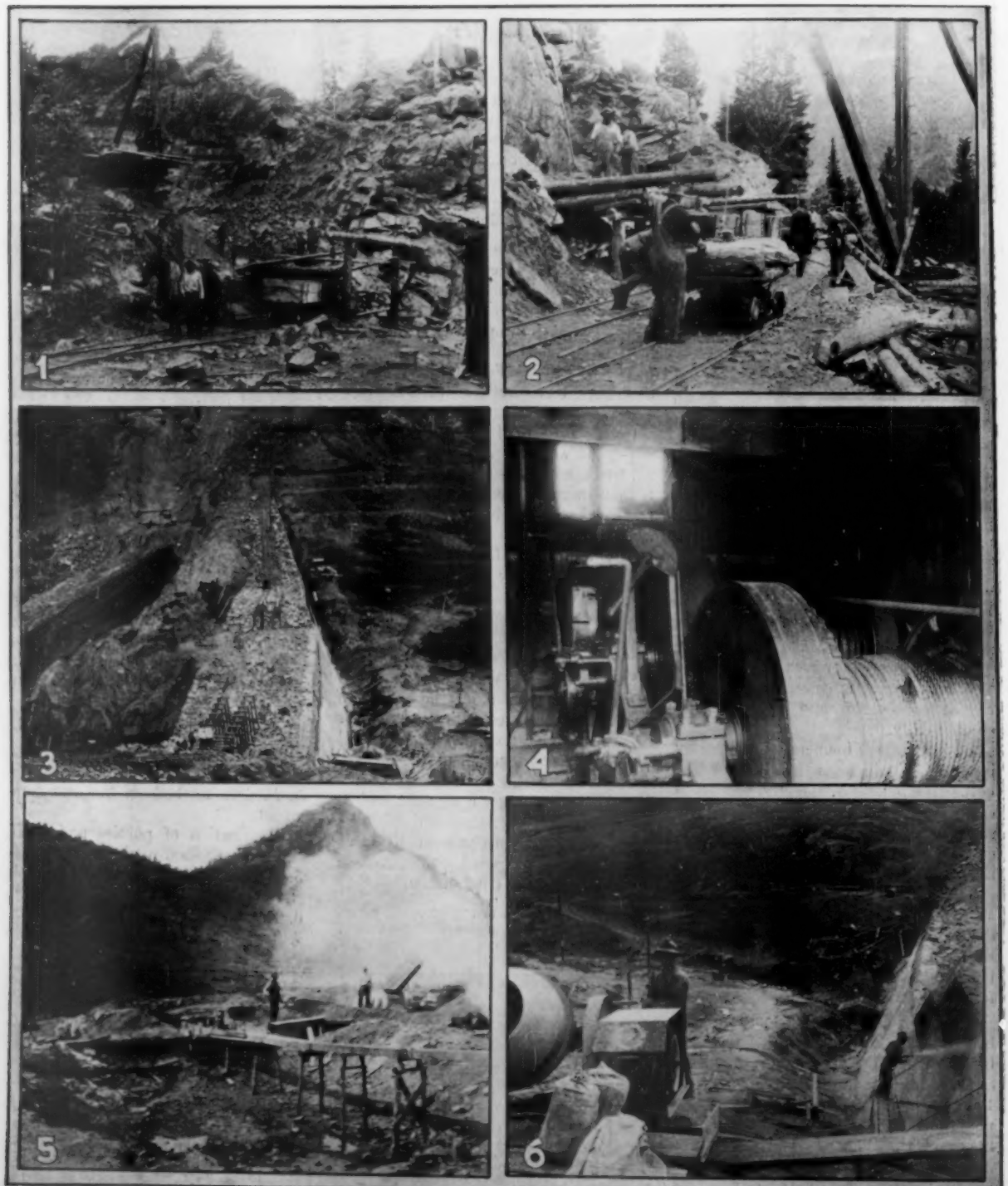
1. Sanitation and not profit shall be the primary consideration.
2. Greater flexibility of service.
3. Modern methods of business management.
4. Elimination of politics and graft, making for slipshod methods.
5. Good service at the lowest possible cost.
6. Responsibility to the public.
7. The fact that municipal ownership

THE BARN OF THE SACRAMENTO HOG FARM

is less expensive because the equipment investment is permanent, and no fund is necessary to meet emergencies that may occur.

In conclusion, I feel that Sacramento's municipally operated garbage service has been brought to a high-water mark in economy and efficiency; and in addition it is more sanitary than when private scavengers made the rounds of Sacramento streets. The value of the improvements that have been made will not only apply to the current year but will be reflected to an even greater degree during succeeding years.

Operations at the Big Tooth Dam of the Colorado Springs Water-Supply



1. The quarry at the west side of the dam. 2. Loading heavy stone at the east quarry. 3. A view across the dam. Note the proportions of the placed stone and fine rock fill. 4. The hoist which handles the big scraper. 5. Preparing the sand for the gunite machine. 6. Facing the dam with gunite

Building a Dam Near Pike's Peak Timber Line

By JOSEPH C. DOYLE

COLORADO Springs, Colo., receives its water-supply from six storage reservoirs with a total capacity of 6,172 acre-feet, which are fed by the almost perpetual snows on a watershed of 26.5 square miles lying along the slopes of Pike's Peak. As a further means of assuring a plentiful supply of water in the future, a new storage reservoir to impound 700 acre-feet of water is nearing completion in Dark Canyon near the timber line of Pike's Peak. A rock-fill dam 100 feet high and 600 feet long on the crest, with a base thickness of 286 feet and a crest width of 15 feet, occupies the narrow gorge in the stream at a point where the junction of several small ravines forms a considerable basin from which all timber has been cleared away.

"Big Tooth" Dam has an elevation of 9,370 feet and is four miles from the town of Manitou, from which all supplies have to be shipped over the famous Pike's Peak cog railroad and hauled for some distance by wagons. Dormitories were erected at the dam site for the crew of 60 men, who are able to work only about six months out of a year, owing to the high elevation and the early snows.

Both sides of the canyon being covered with decomposed granite, a large portion of the fill was first made by excavating the east slope with a 1-yard drag scraper, operated by a 125-horsepower hoist, and sorting out the larger boulders to form the placed rock section of the dam on the upstream side. This placed rock is 70 feet thick at the bottom and 5 feet at the crest. The major portion of the dam is of decomposed granite and small stone, supported on the lower extremity by a 20-foot wall of rubble masonry on a slope of 1½ to 1.

Power for Scraper Operation

A transmission line passing near the dam carries 6,600 volts, which is stepped down to 220 to furnish power for the operation of the scraper, which is handled with a 1,500-foot head line of 1-inch cable. The hoist is geared 5 to 1 on the drum and 2 to 1 on the intermediate shaft, which operates the scraper effectively on the opposite hillsides 1,000 feet away.

A cut-off trench 4 feet wide and 5 feet deep was excavated along the upstream side of the dam, the site of which, a red granite, was stripped to bedrock. In this trench the 4-foot facing of the dam was started. As the work progressed, a coating of gunite was applied to the face of the dam over a network of reinforcing, using a cement gun, which was operated by a Gardner-Denver 12 x 12 compressor driven by a 60-horsepower Westinghouse motor. A particularly large compressor unit was necessary because of the high altitude. Sand for the job is secured in the basin above the dam and hauled to the dam site in sacks. It is washed through sluice boxes into two large storage boxes, from which the sand for ordinary cement work is sacked direct. That used in the gunite machine is piled on a long section of 20-inch iron pipe in which a fire is kept burning, drying the sand before it is sacked.

Drainage

Two 20-inch cast iron pipes, placed 5 feet in the bedrock and covered with concrete, were installed for drainage with hydraulically operated valves at the intake and hand-operated valves at the outlet end. Later, a 30-inch square concrete drain supported by a section of hand-picked rock, 18 feet wide and 10 feet thick, was placed to care for drainage. This strip of placed rock is calculated to prevent undue saturation of the decomposed granite in case of a possible crack in the gunite face of the dam. The spillway of the dam is of rubble masonry 20 feet wide and 8½ feet deep.

After the work was well under way, a scarcity of hard rock in the excavation on the east side of the canyon necessitated the opening of a quarry on each side of the canyon and the construction of a gravity tram on which to lower the rock for the wall. The loaded car pulls the empty one back to the top of the incline at each end of the dam. Tracks were built around the sides of the mountain on which the 1-yard side-dump cars were pushed to the head of the incline after the rock was quarried and loaded. A horse is used to pull the cars from the quarry to the west slope, as it is about 600 feet from the incline. Specially constructed steel scrapers with steel teeth and runners projecting behind the scraper are used in loading the cars. Platforms of rough logs, built alongside the track, are used in loading. A 15-horsepower single-drum hoist with an endless cable operates the scraper at the west quarry. At the east quarry a 20-horsepower two-drum hoist is used both for the scraper and for a derrick which loads the stone.

Stone Dumped from Trestle

Trestles of pine poles support the track in which the stone cars are placed for dumping on the fill. These trestles are 10 feet high and are left in the fill when the level of the track is reached. A hand grab is used in placing the large stones as they are dumped from the cars. The work is being done by day labor under the direction of Frank O. Ray, City Engineer, and G. A. Warning, Field Engineer. Views of the construction work are given on the opposite page.

Taking Away the Trolley Tracks

GALION GRADER AND CATERPILLAR SIXTY OF THE PENINSULA PAVING CO., HELPING TO REMOVE STREET-CAR TRACKS ON SANTA CLARA AVENUE, ALAMEDA, CALIF.

Through the Dark Ages of Street Lighting

*A Sketch of the Historical Development of Outdoor Illumination, from a Newly Published Book**

By CHARLES J. STAHL

THE history of the development of street lighting presents an interesting story beginning ages ago, when some primitive savage first snatched a flaming fagot from an open fire and used it as a torch. By that act was discovered the advantage of utilizing artificial light as a means of finding the way after dark. For ages civilization moved very slowly, and so for hundreds of years the firebrand was the only artificial illuminant in the primitive settlements of man. Necessarily, his work and pleasure were not extended beyond the hours of daylight, and naturally the activities and habits of man gradually changed with the development of artificial illuminants and their extensive use.

In the early stages of development there was a little knowledge accumulated or systematized in reference to the discoveries made in the field of artificial illumination. The science of lighting as we now think of it really had its inception in the discovery and utilization of electricity, and so for the greater part it is a development of comparatively recent times.

This becomes evident when we look back from ten to twenty years and note the great changes which have occurred in the art of illumination. The rate of advance has accelerated with ever-increasing momentum until, for full assimilation of the changes from month to month, the illuminating engineering profession is now faced with the need of specializing.

About the earliest record of a concerted community effort at street lighting goes back to A. D. 200, when lamps were hung before the doors of each house on the prominent streets of Rome. The Romans also placed lights at the entrances to theaters and public baths to establish their identity from a distance, so they were first to make use of the advertising potentiality of light.

From the fall of the Roman Empire in A. D. 476 to the beginning of the fourteenth century was a period of nine hundred years known to historians as the Dark Ages, and they were in reality dark, for there was little growth in the utilization of artificial light. Throughout almost the entire history of artificial lighting there is a close association in its development and the advance of civilization. Considering the depressing influence of darkness and the stimulating effort of artificial light, it seems logical to conclude that this close association is more than a coincidence.

HOW GOING ABOUT AT NIGHT WAS MADE POSSIBLE IN THE MIDDLE AGES

Above is shown a Parisian night watchman of the sixteenth century, with a candle lantern. Below is represented the manner in which a well-to-do citizen undertook a night journey before the days when fixed street lamps made their contribution to public safety

Forward Steps in London and Paris

In 1416 the Mayor of London ordered all prosperous citizens to hang lanterns in front of their property to serve as street lights, and a similar step toward providing a sufficient number and continuity of light sources was taken at Paris in 1524, when by ordinance all citizens were required to place a light in the front window of their homes at nine o'clock each night. A little later lanterns containing candles were suspended at street intersections, and in 1594 a notable improvement was made by the use of glass panels as a part of the lighting fixture. It is interesting to note the following

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* Reprinted by permission from "Electric Street Lighting," published by John Wiley & Sons, Inc. Copyright, 1929, by Charles J. Stahl. See brief review, page 177.

The illustrations shown herewith (excepting that in the center of the next page) are from Preston S. Millar's "Historical Sketch of Street Lighting," which appeared in the *Transactions* of the Illuminating Engineering Society for April 30, 1920; they are reproduced by courtesy of Mr. Millar and the Society. His article, which is a detailed and thoroughgoing treatment, contains several other interesting illustrations of old street lighting, taken from various sources.

VARIOUS STREET LAMPS OF OLD LONDON

excerpt from Mildmay, who wrote in regard to the street lighting of Paris in 1666 as follows:

"The expense of lighting the streets is defrayed also from the receipts of a tax imposed on the householders. Two persons are generally contracted with for this undertaking; the one to find the lanthorns, cords and pullies; and the other to supply the candles; for the streets are here illuminated by hanging lanthorns on the middle of a cord that reaches cross the street; and is fixed to pullies on each side, at about fifteen feet high and about fifteen yards distance from one another. There are 6,500 lanthorns, and consequently as many candles consumed every time they are lighted, which is only twenty times a month, being laid aside during the moon-light nights; and are never lighted, but from the last day of September to the first day of April each year; being taken down and set apart during all the summer months. Elections were held annually in each quarter of the city by the Householders. The persons elected had each charge of fifteen lanthorns and paid 'some menial servant or poor housekeeper' in the same street to perform the duty; accordingly every evening, as soon as it begins to grow dark, the commissary sends out a person, ringing a hand-bell through the streets of the quarter to give notice, as in the morning for cleaning the streets; so now for lighting them; upon which each lanternier's servant immediately sallies out and having a key to the iron box in which the end of every cord is fastened on the sides of the streets, lets down the lanthorn hanging on the same and fixing his lighted candle therein draws it up again; and thus everyone having only fifteen lanthorns under his care, the whole city is illuminated in a very short space after notice; though the light itself is a very indifferent one."

Curiously enough, in some cities objections were raised to street lighting. In Cologne, for instance, many of the citizens set forth the argument that God had ordained that certain hours of darkness should prevail, and that any attempt to illuminate the streets at night was an encroachment on the divinely established order of the universe, and therefore sure of disastrous results. Primitive man retired and arose with the sun, and the medical profession tells us that he was immune to many of the ailments now threatening mankind. Who can says that these are not the punishments predicted by the citizens of Cologne? Notwithstanding the seriousness of the various objections, street lighting steadily grew in popularity.

THE BENJAMIN FRANKLIN STYLE OF LAMP IN PHILADELPHIA

Early Street Lighting in America

In 1772 the city of Boston purchased about 400 street lanterns from England, which were placed in use on March 2, 1774. A few years previously Benjamin Franklin had taken an interest in the street lighting of Philadelphia, and he later described his experiences as follows:

"After some time I drew a bill for paving the city, and brought it into the Assembly. It was just before I went to England in 1757, and did not pass till I was gone, and then with an alteration in the mode of assessment, which I thought not for the better, but with an additional provision for lighting as well as paving the streets, which was a great improvement. It was by a private person, the late John Clifton, his giving a sample of the utility of lamps, by placing one at his door, that the people were first impressed with the idea of enlighting all the city. The honor of this public benefit has also been ascribed to me, but belongs truly to that gentleman. I did but follow his example, and have only some merit to claim respecting the form of our lamps, as differing from the globe lamps we were at first supply'd with from London. Those we found inconvenient in these respects: they admitted no air below; the smoke, therefore, did not readily go out above, but circulated in the globe, lodg'd on its inside, and soon obstructed the light they were intended to afford; giving, besides, the daily trouble of wiping them clean; and an accidental stroke on one of them would demolish it, and render it totally useless. I therefore suggested the composing them of four flat panes, with a long funnel above to draw up the smoke, and crevices admitting air below, to facilitate the ascent of the smoke; by this means they were kept clean, and did not grow dark in a few hours, as the London lamps do, but continued bright till morning, and an accidental stroke would generally break but a single pane, easily repair'd."

Following the introduction of lanterns having glass panels, the next distinct advance in the art of street lighting was in 1745, when the use of polished metal reflectors was introduced. The next step was the introduction of natural gas and the development of a process for making artificial gas from coal. The first outdoor gas lamp was used at Birmingham, England, and the first city in America to be lighted by gas was Baltimore, in 1817.

The First Electric Street Lighting

The beginning of electric street-lighting systems in this country came with

EARLY USE OF GAS IN STREET LIGHTING

the introduction of the arc lamp in 1879, when twelve units were installed in the Public Square in Cleveland.

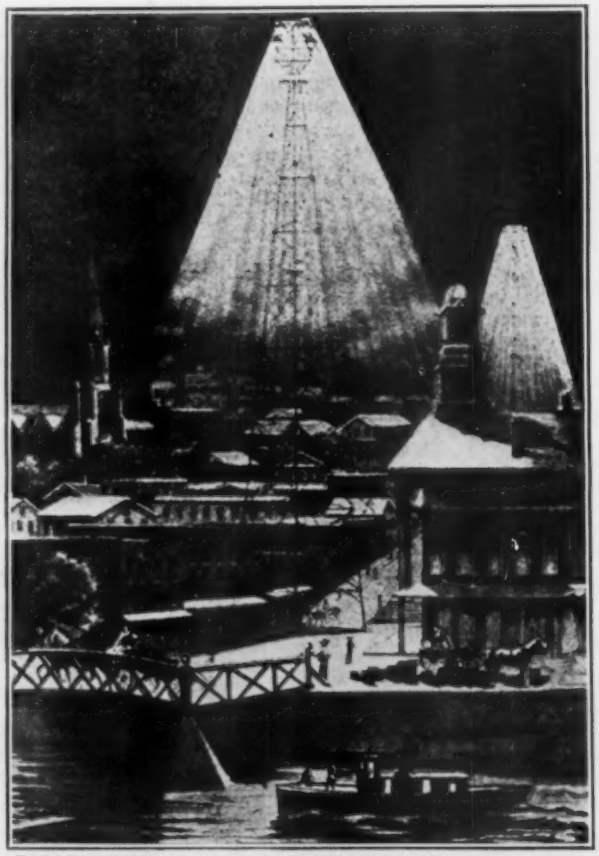
Some of the early accounts of newly installed street-lighting systems are very interesting when viewed in the light of present-day knowledge.

For example, on July 14, 1883, Evansville, Ind., turned on its new lighting system, consisting of arc lamps, widely spaced and mounted on high structural-steel towers. The following appeared in the *Daily Courier* on the day after the first night the streets were lighted by electricity:

"At half past eleven last night gentlemen to the number of twenty met at Progress Hall, where carriages were waiting for them, for the purpose of witnessing the initial lighting of the city by electricity. The head of the procession moved toward the hills near Babytown, and just as they reached a point where the best view could be obtained, the flash of electric light burst upon their visions. A better pleased surprised party never gathered together to view anything. Like a flash of lightning mellowed by distance the light broke upon the party fully a mile away from the nearest tower. A dozen watches were immediately drawn in order to test the numerous statements heretofore given of the power of the light to cover distance. A half dozen gentlemen rallied around Mayor Bridwell's watch and called the hour like sentinels on a watch, twenty minutes to one. While this pleasing sight greeted the gentlemen on the hill, Mr. Jacob Eichel, the head and front of the Electric Light offering, was crying from the road below for some one to come and hold his horse, that he too might take in some of the delight. His anxiety being allayed, it was but a few minutes before the party were again seated in their carriages with the horses' heads pointed toward the city. A drive was then taken around each tower and the distance gauged to more effectually realize the successful display; then through the city, lit by the arch system, and to the river front to note the success of the light there. Hundreds of people were seen in the outskirts with heads out of windows, many of them displaying toilets that they thought were not visible to the passers-by. Could they have seen themselves as others saw them, it might have made them mad—perhaps. The result of last night's experiment was just what every fair-minded person has anticipated, and what was known to all the world outside of Pigeon township. Let doubters now take the rear rank. Personal observation, and it can be had from this time on, will convince the beholder that the revolution in light is a fixed fact, and electricity has been the revolutionist.

"The united effect of these great sun lamps last night was interesting, novel and impressive to an almost indescribable degree, the districts immediately adjacent to the towers being bathed in splendor far higher in soft intensity than the most brilliant system of street gas jets, while a suburban ride of five-eighths of a mile beyond the outside towers realized a light as clear as full summer moonlight lying abroad on the dark fields and lonely outskirts of the city.

"In the immediate vicinity of the towers the light is very brilliant and the shadows formed are very sharply defined. As you go from the light toward a shadow it appears to be dark beyond; but on arriving at the shadow the light is still perfect, though not so strong. The light produced is unquestionably the most perfect imitation of sunlight ever produced by human skill. . . ."



EARLY ELECTRIC LIGHTING BY ARC LAMPS ON HIGH TOWERS

Ascendency of the Incandescent Lamp

The invention of the carbon filament incandescent lamp, although marking an epoch in the lighting of the home, had little effect on the popularity of the arc lamp for street-lighting service. The first improvements in the incandescent lamp, namely, the use of metalized carbon and tantalum-wire filaments, also left the status of street lighting unchanged except for progress made in the efficiency and more extensive use of arc lamps. The invention of the tungsten-filament lamp in 1907 presented a competitor for the arc, not only because of the substantially increased efficiency of incandescent lamps resulting from the use of tungsten filaments, but also because of economies made possible by the variety of sizes in which the tungsten-filament incandescent lamp was produced. It was this lamp which made it possible to combine the maximum of utility and decorative effects in the so-called ornamental posts which immediately became popular in the creation of White Ways by the installation of cluster posts. These steadily grew in popularity, but with the introduction of the gas-filled Mazda C lamp, cluster posts gave way to single-light units.

Throughout the United States we still find a few cluster posts. These are legacies of the vacuum-bulb tungsten lamp. Greater efficiency is at present obtained by the use of a single lamp of large size having a wattage consumption equal to and in some cases less than the aggregate of three or more units used in the old cluster arrangement. . . .

Throughout the United States the average annual expenditure per capita for street lighting in 1928 did not reach $1. In common with many municipal activities, street lighting suffered neglect during the World War, when domestic expenditures were curtailed and local benefits sacrificed in order promptly to participate to the fullest extent in operations abroad. Then the administrations immediately following the war encountered a period of downward trend in prices and subnormal prosperity, which caused a delay in the resumption of normal activities, so they not only hesitated to enlarge community expenditures, but allowed taxation to lag, and in many cases passed on to this day some substantial deficits as well as inadequate rates. With the return to normal conditions, street lighting and other public works have greatly increased, and there is every indication that in the near future most American cities will take steps toward profiting in more ample measure by a fuller utilization of this potent agency for good. Many localities have no more than one lamp for each street intersection, but such installations are those of ten or more years ago still lingering on.

A MONTHLY OPEN LETTER

November 1, 1929

Honorable Sirs:

THERE are some winds that blow nobody good. Such is a wind that fans a flame. Fire loss is unmitigated. It is a total, irrevocable destruction of social goods. For the individual the loss may be relieved through insurance, but for the community, broadly considered, there is no escape.

Fires and fire fighting have their dramatic thrill. It is a useful work which the public ungrudgingly supports. Any fire department is worth to the community ten times its cost. Money wisely spent on such activity is money well spent. But there are other things which are cheaper.

PREVENTION, for example, costs little but bears fruit a hundredfold. A certain proportion of fires are the result of pure accident. A vastly greater proportion are humanly preventable, not that there is any human probability that we shall be able to attain such perfection. It has the further merit of giving the public something to do. We ask too little of our citizens. Somehow we think that the payment of taxes represents the complete liquidation of the citizen's debt to the community in which he lives.

Here at least is something that requires little urging. Attics and cellars need periodically to be sorted over. Some psychologists, perhaps with a memory of such attics and cellars, say we have a "hoarding instinct" come down from cave-man days. Certainly all of us hoard, from the little boy with his cigarette pictures and stamps to his father with odds and ends of old hinges, locks, clocks and screws, or his mother with collections of bits of string. A little humor tenderly applied works wonders in getting our treasure chambers put in order. And folks see the point of it. Back yards, stairway closets, even the garage with its oily rags, are likely offenders.

IN cities of every size, but particularly in those not so overgrown as to crowd their best citizens into suburbs beyond their boundaries, there are people eager to do something to evince their civic spirit. This instinctive feeling all have. In large cities it is all too frequently stifled because of the difficulty of organizing great numbers of people for cooperative effort. Life in such cities is lived at a hard driving pace. The citizen and his government soon drift apart and become estranged. The best and best-liked city governments are those which give the citizens a chance to do something. This, fire prevention work readily does.*

Adult enthusiasm, of course, ebbs and flows. It requires constant pumping. But there is also an unquenchable source of civic enthusiasm—and that is the children. Their schoolroom civics is rarely a dull course, but here is a chance to fall in with one of the latest educational theories—learning by doing. Fire prevention work gives civic classes something to do. The youngsters can go home and look for such items as rubbish, old rags, exposed or frayed insulation, cluttered fire-escapes, nailed attic hatchways, and scores of other little things that bright eyes quickly see. They readily absorb warnings about lighting fires with kerosene, building bonfires, permitting children to play with matches (if your local psychologist will permit you to suggest evil by your exhortation to good). These youngsters are the best of crusaders. From their own homes they readily extend their influence over the neighborhood. Rubbish, strewn lots and yards will be made short work of.

THE city government's responsibilities begin where these popular efforts leave off. Its building department has an important task in seeing to it that electric wiring specifications are carefully devised and fully adhered to. All such work should be tested and inspected before a permit to turn on the current is issued. It is not unreasonable to charge for these tests so that the fee becomes part of the installation cost. Where gas is used it is not difficult to secure the cooperation of the gas company to eliminate leaky fixtures or dangerous appliances.

Building standards are usually a matter for local ordinance. They should be pushed steadily upward. We should no more content ourselves with the feeble standards worked out by our fathers than we would accept as conveyance an 1896 horseless buggy. Our very prosperity entitles us to higher standards of public safety. Frame construction and wooden shingles have no place except in comparative isolation. True, you will run afoul of the lumber men with this, but you will have allies in the fireproof shingle makers, and the local supply dealers are, of course, neutral. Rows of cheap buildings are poor economy. They are the slums of tomorrow.

ONE clinching argument for serious consideration of these problems is your local insurance schedule. Check over your hydrant facilities, your pressure, the fire department's rating, and see whether you cannot save dollars and cents for your citizens by securing a revision. Organize a committee of business men to look into this situation. (Never miss a chance to organize a good committee.)

Yours cooperatively,

HINTSAND POINTERS.

* See "Civic Spirit Down Cellar," page 97.

A Survey of Water-Meter Rates in the United States—Part VI

The rates here given in detail are from the original reports furnished to THE AMERICAN CITY *in connection with the water-supply statistics published in The Municipal Index for 1929. In The Municipal Index only domestic maximum and industrial minimum rates were given, together with many other statistics besides rates.*

NORTH DAKOTA

Casselton, 1,500.

Gals. per Quarter	Per 1,000 Gals.
1,000 to 5,000	60¢
5,000 to 10,000	50¢
10,000 to 20,000	40¢
Over 20,000	30¢

Minimum, $1.50 per quarter.

Devils Lake, 5,100.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 1,200	40¢
1,200 to 2,000	30¢
2,000 to 4,000	20¢
4,000 to 15,000	15¢
15,000 to 20,000	7¢
Over 20,000	5¢

Minimum, $1 per month.

Grand Forks, 15,000.

Gals. per Month	Per 1,000 Gals.
First 1,000	50¢
Next 4,000	40¢
" 5,000	35¢
" 10,000	30¢
" 10,000	28¢
" 10,000	25¢
" 10,000	20¢
" 50,000	15¢

Mandan, 6,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 666⅔	37½¢
Next 666⅔	30¢
" 666⅔	26¼¢
" 666⅔	24¢
" 666⅔	22½¢
" 666⅔	22¢
" 666⅔	21¢
" 666⅔	19¢
" 666⅔	16½¢
" 666⅔	15¹/₀¢
Over 6,666⅔	13½¢

Water rates from May 15 to October 15 for water used on lawns, trees and gardens, 12¢ per 100 cubic feet over the average consumption of water used from October 15 to May 15, provided that the first 400 cubic feet shall be charged at the rate of 37½¢ per 100 cubic feet with a minimum charge of $1.50.

OHIO

Ada, 3,000.

Cu. Ft. per Month	Per 1,000 Cu. Ft.
First 4,000	3.00
Next 3,500	2.70
" 5,000	2.50
Over 12,500	2.00

Minimum Charges

Size of Meter	Per Month
⅝"	$1.25
¾"	2.25
1"	2.75
1¼"	3.25
1½"	4.25
2"	6.25
3"	12.25

Akron, 230,000.

Cu. Ft. per Month	Per 1,000 Cu. Ft.
First 20,000	$1.60
Next 20,000	1.50
" 20,000	1.40
" 20,000	1.30
Over 80,000	1.20

Minimum Charges

Size of Meter	Per Month
⅝"	$1.20
¾"	2.00
1"	3.00
1¼"	4.00
2"	5.00
2"	7.00
4"	10.00
6"	15.00
8"	25.00
10"	40.00

Athens, 7,500.

Gals. per Six Months	Per 1,000 Gals.
First 15,000	25¢
Next 35,000	20¢
" 50,000	19¢
" 100,000	18¢
" 100,000	17¢
" 100,000	16¢
Over 400,000	15¢

Definitions

Meter Rent.—In some works a charge is made for the rent of meters furnished and owned by the department. Where such a charge is made, it is in reality a service charge and it must be so classified. The service charge as now used ordinarily covers meter rent and much more, so that the meter rent represents only a fraction of the amount of what may be considered the normal service charge. Cases may be found where meter rents are used in connection with a minimum rate, but with this minor exception the service charge is not used in connection with a minimum rate.

Minimum Rate.—A minimum rate is an amount that is collected in any event, even though the price of the quantity of water registered by the meter does not amount to it.

Service Charge.—A service charge is a charge for the service, which is in addition to the amount that is charged for water.

Modified Service Charge.—Under this form there is a minimum charge for a certain quantity of water, and the amount of the minimum is made up of what would otherwise be the service charge and the meter rate for that quantity of water that is furnished for the minimum charge.

Uniform Rate.—A rate per thousand gallons or per hundred cubic feet that is charged uniformly for all quantities of water sold.

Jump Scale.—The quantities of water up to a certain limit are charged at a certain price; beyond that limit and inside another limit another and lower price is made, and beyond that there is another limit and another price, and so on. In some cases, two prices only are used; in others three, four or more, up to a dozen or twenty; and, in fact, divisions may be so numerous that the scale practically becomes a table which gives the water rate for every quantity of water that a meter records.

Modified Jump Scale.—Under this arrangement each step in the jump scale is subdivided into two parts, the second of which comprises all those quantities for which it would be possible to get a lower rate by drawing more water. For these quantities a lump sum collection is made, which sum is the minimum that could be obtained under the next step. For the first part of each step the rate remains as with the jump schedule.

Sliding Scale.—Under this arrangement the water first drawn up to a certain limit is charged at a certain rate. Additional quantities are charged at a lower rate, but the higher charge on the first quantity remains as part of the bill in all cases.

—From "Meter Rates for Water Works," by Allen Hazen, published by John Wiley & Sons, Inc., New York.

Meter Rental

Size of Meter	Per Year
⅝"	$2
¾"	3
1"	4
1¼"	5
1½"	7
2"	10
3"	15

Minimum, $3.75 for six months.

Avon Lake Village, 1,200.

Gals. per Quarter	Per 1,000 Gals.
First 75,000	30¢
Next 675,000	22¢
Over 750,000	15¢

Service Charge

Size of Meter	Per Quarter
⅝"	$1.50
¾"	2.25
1"	3.00
1¼"	5.00
2"	7.50
6"	50.00

Canton, 110,000.

Cu. Ft. per Quarter	Per 1,000 Cu. Ft.
First 20,000	$1.00
Next 20,000	0.85
Over 40,000	0.75

Minimum Rates

Size of Meter	Per Quarter
⅝"	$2.50
¾"	3.15
1"	3.75
1¼"	5.00
1½"	6.25
2"	7.50
3"	12.50
4"	17.50
6"	31.25
8"	37.50

Columbus, 295,000.

Cu. Ft. per Month	Per 1,000 Cu. Ft.
First 25,000	$1.20
25,000 to 200,000	1.15
200,000 to 1,000,000	1.10
1,000,000 to 2,000,000	1.00
Over 2,000,000	0.60

Minimum, 40¢ per month.

Conneaut, 12,420.

Gals. per Month	Per 1,000 Gals.
First 30,000	40¢
Next 30,000	35¢
" 30,000	30¢
" 30,000	25¢
" 380,000	15¢
" 500,000	12¢
Over 1,000,000	9¢

Minimum, $4 per quarter, allowing 10,000 gallons.

East Palestine, 5,500.

Domestic Rates

Gals. per Quarter	Per 1,000 Gals.
First 10,000	25¢
Next 20,000	15¢
Over 30,000	10¢

Factory Rates

Gals. per Month	Per 1,000 Gals.
First 3,333⅓	25¢
Next 6,666⅔	15¢
" 100,000	10¢
" 1,000,000	8¢
" 5,000,000	6½¢
Over 6,110,000	6¢

Franklin, 4,000.

Gals. per Quarter	Per 1,000 Gals.
40,000	20¢
80,000	15¢
130,000	13¢
250,000	12¢
500,000	11¢
2,000,000	10¢
3,000,000	8¢

Minimum, $7.50 per year.

Hudson, 1,400.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 500	40¢
Next 2,500	20¢
" 7,000	10¢
Balance	8¢

Minimum, $2 per quarter.

Kent, 8,000.

High Pressure Service

Cu. Ft. per Quarter	Per 1,000 Cu. Ft
First 1,000	$2.80
Next 1,000	2.65
" 3,000	2.40
" 5,000	2.00
Excess	1.00

Minimum Charges for H. P. Service

Size of Meter	Per Quarter
⅝"	$2.25
1"	9.00
1¼"	12.00
2"	15.00
3"	21.00
4"	30.00
6"	45.00
8"	75.00

Low Pressure Service

Gals. per Month	Per 1,000 Gals.
First 1,000,000	10¢
Next 4,000,000	6¢
Over 5,000,000	4¢

Fixed Service Charge for L. P. Service

Size of Meter	Per Month
2"	$5.00
3"	10.00
4"	15.00

Minimum rate per month is the fixed meter charge.

Lisbon, 3,800.

Cu. Ft. per Quarter	Per 1,000 Cu. Ft.
First 5,000	$4.00
Next 5,000	3.50
" 5,000	2.50
Over 15,000	2.00

Minimum, $3 per quarter for 700 cubic feet.

Marion, 33,000.

Domestic Service

Cu. Ft. per Month	Per 100 Cu. Ft.
First 1,000	45¢
Next 4,000	40¢
" 10,000	35¢
" 15,000	30¢
" 20,000	25¢
Over 50,000	20¢

Commercial and Industrial Service

Cu. Ft. per Month	Per 100 Cu. Ft.
First 1,000	45¢
Next 4,000	40¢
" 10,000	35¢
" 15,000	27½¢
" 20,000	22½¢
Over 50,000	19¢

Minimum Charges

Size of Service	Per Month
¾"	$1.50
1"	2.00
1½"	4.00
1½"	6.00
2"	8.00
3"	15.00
4"	30.00
6"	60.00
8"	100.00

North Baltimore, 2,800.

Gals. per Month	Per 1,000 Gals.
First 2,000	70¢
Next 2,000	60¢
" 4,000	45¢
Excess	30¢
Over 1,000,000	22¢

Minimum, $1.40 per month, including 2,000 gallons.

Oberlin, 6,000.

Cu. Ft. per Quarter	Per 1,000 Cu. Ft.
First 5,000	$3.50
Next 5,000	2.85
" 5,000	2.34
Over 15,000	1.87

Minimum, $2.80 per quarter.

Orrville, 4,600.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 2,000	20¢
Next 8,000	16¢
" 40,000	11¢
Over 50,000	9¢

Meter Rental

Size of Meter	Per Month
½"	$0.80
¾"	1.20
1"	1.80
1½"	2.50
2"	3.50
3"	6.50
4"	12.00
6"	25.00

Painesville, 10,000.

Cu. Ft. per Quarter	Per 1,000 Cu. Ft.
First 6,000	$2.40
Next 6,000	2.00
" 6,000	1.60
" 6,000	1.40
" 6,000	1.30
" 6,000	1.20
" 6,000	1.00
Over 42,000	0.80

Minimum, $3 per quarter.

Where the consumption exceeds 30,000 cubic feet per month, $1 per 1,000 cubic feet is charged for the first 50,000 cubic feet and 80¢ per 1,000 cubic feet for the balance.

Tiffin, 16,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 334	38¢
Next 2,666	32¢
Next 4,333	24¢
Over 7,334	10¢

Fixed Charges

Size of Meter	Per Month
¾"	$1.25
1"	2.08
1½"	2.52
2"	3.15
3"	6.29
4"	9.42
6"	16.67

Troy, 8,000.

Cu. Ft. per Quarter	
First 1,500	$2.00
	Per 1,000 Cu. Ft.
Next 3,500	$1.75
" 5,000	1.50
" 10,000	1.25
Over 20,000	0.50

Minimum Rates

Size of Meter	Per Quarter
¾"	$2.00
¾"	3.00
1"	5.00
1½"	8.00
2"	12.00

West Jefferson, 2,000.

Gals. per Quarter	Per 1,000 Gals.
First 5,000	50¢
Next 10,000	45¢
" 10,000	40¢
" 25,000	35¢
" 50,000	30¢
" 100,000	25¢
" 500,000	23¢
Over 700,000	20¢

Minimum, $2.50 per quarter.

Youngstown, 165,000.

Cu. Ft. per Quarter	Per 1,000 Cu. Ft.
First 1,000	$2.00
Next 19,000	1.50
" 25,000	1.00
Over 45,000	0.80

Zanesville, 36,000.

Cu. Ft. per Month	Per 1,000 Cu. Ft.
First 2,500	$2.40
Over 2,500	0.75

Minimum, $10 per year.

OKLAHOMA

Bartlesville, 20,000.

Gals. per Month	Per 1,000 Gals.
First 25,000	47¢
Next 25,000	42¢
" 50,000	37¢
" 50,000	32¢
" 1,350,000	25¢
" 1,500,000	15¢

Broken Bow, 2,500.

Gals. per Month	
First 2,000	$1.50
	Per 1,000 Gals.
2,000 to 5,000	50¢
5,000 to 10,000	40¢
10,000 to 25,000	30¢
Over 25,000	Special

Cordell, 3,000.

Gals. per Month	
First 4,000	$1.00
	Per 1,000 Gals.
4,000 to 10,000	25¢
10,000 to 15,000	20¢
15,000 to 20,000	15¢
Over 20,000	10¢

Durant, 10,000.

Gals.	Per 1,000 Gals.
First 2,000	85¢
Next 3,000	31¢
" 5,000	19¢
" 15,000	18¢
" 25,000	16¢
" 50,000	15¢
" 400,000	14¢
Over 500,000	7½¢

Enid, 32,000.

Gals. per Month	Per 1,000 Gals.
First 30,000	25¢
30,000 to 45,000	20¢
45,000 to 60,000	18¢
Over 60,000	15¢

Minimum, 50¢ per month.

Fairfax, 2,500.

Gals. per Month	
1,000 to 2,000	$1.13
	Per 1,000 Gals.
2,000 to 3,000	51¢
3,000 to 4,000	49½¢
4,000 to 5,000	48¢
5,000 to 6,000	46½¢
6,000 to 7,000	45¢
7,000 to 8,000	43½¢
8,000 to 9,000	42¢
9,000 to 10,000	40½¢
10,000 to 11,000	39¢
11,000 to 12,000	38¢
12,000 to 13,000	36¢
13,000 to 14,000	35½¢
14,000 to 15,000	33¢
15,000 to 16,000	31½¢
Over 25,000	22¢

¾" meter rental, 37¢ per month.

Garber, 2,400.

Gals. per Month	Per 1,000 Gals.
2,000 to 5,000	55¢
5,001 to 10,000	50¢
10,001 to 20,000	45¢
20,001 to 40,000	40¢
40,001 to 60,000	35¢
60,001 to 1,000,000	30¢
1,000,001 to 2,000,000	25¢
Over 2,000,000	20¢

Hollis, 4,000.

Minimum, $1.50 per month.
Excess, 25¢ per 1,000 gallons.

Idabel, 4,000.

Gals. per Month	Per 1,000 Gals.
First 10,000	50¢
Next 20,000	40¢
" 45,000	30¢
Over	20¢

Madill, 2,717.

Gals. per Month	
First 2,000	$1.00
	Per 1,000 Gals.
2,000 to 500,000	30¢
500,000 to 1,000,000	15¢
1,000,000 to 2,000,000	12½¢
2,000,000 to 3,000,000	10¢
3,000,000 to 4,000,000	9¢
Over 4,000,000	8¢

Morris, 2,200.

Gals. per Month	Per 1,000 Gals.
0 to 1,000	$1.00
1,000 to 5,000	0.50
5,000 to 15,000	0.40
15,000 to 40,000	0.35
40,000 to 60,000	0.30
60,000 to 80,000	0.25
80,000 to 100,000	0.20
100,000 to 150,000	0.15
150,000 to 300 000	0.12
Over 300,000	0.10

Muskogee, 35,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 3,000	20¢
Next 60 000	18¢
" 60,000	15¢
" 60,000	12¢
Excess	9¢

Minimum, $1 per month.

Okemah, 5,500.

Gals. per Month	
First 2,000	$1.25
	Per 1,000 Gals.
Next 3,000	50¢
" 10,000	40¢
" 35,000	30¢
" 50,000	20¢
Over 100,000	18¢

Quinton, 1,500.

Gals. per Month	Per 1,000 Gals.
First 1,000	50¢
Next 3,000	35¢
" 5,000	30¢
" 10,000	25¢
" 50,000	20¢
" 100,000	14¢
Over 100,000	10¢

Minimum, $1 per month.

Shawnee, 32,000.

Gals. per Month	
First 2,000	$1.00
	Per 1,000 Gals.
Next 3,000	45¢
" 15,000	40¢
" 30,000	35¢
" 50,000	30¢
" 100,000	25¢
" 300,000	20¢
" 500,000	15¢
" 1,000,000	10¢

Tulsa, 125,000.

Gals. per Month	Per 1,000 Gals.
First 15,000	35¢
Next 22,000	30¢
" 38,000	25¢
" 75,000	20¢
" 100,000	15¢

Total for first 250,000, $51.35. Over 250,000, 15¢ per 1,000 gallons.

Minimum Charges

Size of Meter	Per Month
¾"	$0.75
1"	1.25
1½"	1.75
2"	2.50
Over	3.00

Woodward, 6,200.

Gals. per Month	
First 5,000	$1.00
	Per 1,000 Gals.
Next 5,000	20¢
" 50,000	15¢
" 100,000	12¢
" 500,000	10¢
" 500,000	8¢
Excess	7¢

OREGON

Bend, 10,000.

Cu. Ft. per Month	
First 200	$1.60
	Per 100 Cu. Ft.
Next 300	25¢
" 1,500	11¢
" 8,000	8¢
Over 10,000	6¢

Applicable during the sprinkling season, from May to September, to consumers using water for domestic and irrigation purposes only, excepting apartment houses, flats, boarding houses and residences

housing more than one family, which shall be entitled to the rate of 5¢ per 100 cubic feet for the excess over the normal monthly consumption. The normal monthly consumption shall be determined by taking the average consumption of water for the eight preceding non-irrigation months.

Corvallis, 11,000.

Gals. per Month	Per 1,000 Gals.
0 to 5,000	30¢
5,000 to 50,000	20¢
Over 50,000	15¢

Minimum Charges

Size of Meter	Per Month
½" and ¾"	$1.50
1"	2.00
1½"	2.50
2"	3.50
3" and over	5.00

Eugene, 23,000.

Primary rate, applying only to first 4,000 cubic feet per month per inch diameter of meter:

	Minimum
First 300 or less	
Over 300	15¢ per 100 cubic feet

Secondary rate, applying to excess over limit of primary rate:

First 20,000 cu. ft. at 7¢ per 100 cu. ft.
Over 20,000 cu. ft. at 5¢ per 100 cu. ft.

Minimum Charges

Size of Meter	Per Month	Additional Charge for Meter Larger than ¾"	Limit of Primary Rate
⅝" or ½"	$1.15		2,500
1"	1.55	$0.40	4,000
1½"	2.25	1.10	6,000
2"	2.85	1.70	8,000
3"	4.30	3.15	12,000
4"	7.05	5.90	16,000

Klamath Falls, 14,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 300	$1.75
Next 700	22¢
" 4,000	15¢
" 25,000	10¢
Over 30,000	8¢

Special sprinkling or irrigation rate, applicable only on May to September readings, and for use only by resident consumers actually using water for sprinkling lawns or gardens and by other customers using water for sprinkling or irrigation purposes only:

First 500 cubic feet or less at regular rate.
Over 500 cubic feet, 10¢ per 100 cubic feet.

Minimum Charges

Size of Meter	Per Month
⅝"	$1.75
¾"	2.25
1"	2.75
1½"	3.25
2"	4.50
3"	6.75
4"	10.00

Ontario, 2,500.

Gals. per Month	Per 1,000 Gals.
First 3,000	$1.25
Next 3,000	35¢
" 10,000	20¢
" 84,000	15¢
Over 100,000	12¢

Oregon City, 6,000.

Cu. Ft.	Per 1,000 Cu. Ft.
First 2,000	15¢
Over 2,000	12¢

Portland, 361,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 20,000	9½¢
Over 20,000	7½¢

Minimum 60¢ per month.

PENNSYLVANIA

Altoona, 65,000.

Rates Charged by City Water Bureau

Cu. Ft. per Six Months	Per 100 Cu. Ft.
First 2,000	$3.75
Next 5,000	15¢
" 50,000	10¢
" 300,000	5¢
Over 357,000	4¢

Allegheny Water Company Rates

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 2,000	35¢
Next 20,000	20¢
" 200,000	7¢
Over 222,000	3¢

Service Charge

Size of Meter	Per Year
½" or ⅝"	$6.00
¾"	9.00
1"	12.00
1¼"	18.00
1½"	24.00
2"	48.00
3"	96.00
4"	200.00
9"	400.00

Avis, 1,800.

Gals. per Quarter	Per 1,000 Gals.
First 100,000	25¢
Next 450,000	20¢
" 450,000	15¢
" 1,000,000	10¢
" 3,000,000	8¢
" 5,000,000	5¢
" 10,000,000	4¢
" 20,000,000	3¢

Consumers using more than 10,000,000 gallons per month may choose the following meter rates instead of the above:

First 10,000,000	5¢
Next 2,500,000	4½¢
" 2,500,000	4¢
" 5,000,000	2½¢
Over 20,000,000	2¢

Service Charge

Size of Meter	Per Quarter Gross	Per Quarter Net
⅝"	$ 3.20	$ 2.88
¾"	4.00	3.60
1"	5.00	4.50
1¼"	7.50	6.75
1½"	10.00	9.00
2"	20.00	18.00
2½"	31.00	27.90
3"	45.00	40.50
4"	80.00	72.00
6"	180.00	162.00
8"	320.00	288.00

Bedford, 3,000.

Gals. per Quarter	Per 1,000 Gals.
First 3,750	$1.50
3,750 to 100,000	40¢
100,000 to 200,000	35¢
200,000 to 300,000	30¢
300,000 to 400,000	25¢
Over 400,000	20¢

Blairsville, 6,000.

Gals. per Quarter	Per 1,000 Gals.
First 3,000	$1.00
Next 17,000	.40
" 80,000	.30
Over 100,000	.20

Minimum, $2.50 per quarter.

Clearfield, 10,000.

Gals. per Quarter	Per 1,000 Gals.
First 15,000	30¢
Next 35,000	20¢
" 150,000	10¢
Over 200,000	6¢

Service Charge

Size of Meter	Per Quarter
⅝"	$1.50
¾"	2.25
1"	4.00
1½"	8.00
2"	12.00
3"	25.00
4"	50.00

Dayton, 1,100.

Gals. per Year	Per 1,000 Gals.
First 18,000	$18.00
18,000 to 50,000	40¢
50,000 to 100,000	30¢
100,000 to 150,000	25¢
150,000 to 250,000	20¢
Over 250,000	15¢

Downington, 5,000.

Gals. per Quarter	Per 1,000 Gals.
First 8,000	25¢
8,000 to 20,000	20¢
20,000 to 40,000	18¢
40,000 to 60,000	16¢
60,000 to 100,000	14¢
100,000 to 200,000	12¢
200,000 to 500,000	10¢
Over 500,000	9¢

Minimum Charge

Size of Meter	Per Year
⅝"	$8.00
¾"	12.00
1"	16.00
1½"	28.00
2"	60.00

Easton, 20,000.

Gals. per Quarter	Per 1,000 Gals.
First 5,000	40¢
Next 10,000	35¢
" 20,000	30¢
" 60,000	20¢
" 180,000	15¢
" 475,000	11¢
Over 750,000	8¢

Minimum Charges

Size of Meter	Per Quarter
¾"	$4.50
1"	8.00
1¼"	12.00
1½"	15.00
2"	30.00
3"	45.00
4"	60.00
6"	90.00

Freeland, 8,000.

For ⅝" and ¾" Meters

Gals. per Month	Per 1,000 Gals.
First 500	$1.00
Next 24,500	50¢
Next 50,000	30¢
Excess	28¢

For 1¼" to 6" Meters

First 100,000	28¢
Next 400,000	20¢
Excess	18¢

Minimum

Size of Meter	Per Month
1¼"	$3.50
1½"	6.00
2"	10.00
3"	15.00
4"	25.00
6"	50.00

Girardville, 6,000.

Minimum Allowing 2,500 Gals.

Size of Meter	Per Quarter
⅝"	$2.25
¾"	2.75
1"	4.00
1¼"	5.60
1½"	7.60
2"	12.60
3"	27.00
4"	47.00
6"	105.00
8"	185.00

Gals. per Quarter	Per 1,000 Gals.
Next 22,500	45¢
" 225,000	38¢
" 2,750,000	30¢
Over 3,000,000	22¢

Greensburg, Jeanette and Irwin, 53,000.

Gals. per Month	Per 1,000 Gals.
First 100,000	18¢
Over 100,000	12¢

Service Charge

Size of Meter	Per Year
⅝" A	$6.00
⅝" B	10.00
¾"	16.00
1"	24.00
1½"	48.00
2"	96.00
3"	192.00

Class A, domestic consumers having 3 outlets or less.

Class B, consumers having more than 3 outlets.

Meadville, 16,000.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 2,500	17¢
Next 7,500	12¢
Over 10,000	10¢

Monaca, 5,000.

Gals. per Quarter	Per 1,000 Gals. Gross	Per 1,000 Gals. Net
First 100,000	42¢	38¢
Next 100,000	34¢	30¢
" 200,000	24¢	20¢
" 200,000	18¢	16¢
" 400,000	17¢	15¢
Over 1,000,000	16¢	14¢

Minimum, allowing 7,000 gallons, $2.94 gross, $2.50 net.

Mt. Union, 7,000.

Gals. per Month	Per 1,000 Gals.
First 4,000	50¢
4,000 to 10,000	35¢
10,000 to 200,000	15¢
200,000 to 300,000	12¢
300,000 to 400,000	10¢
400,000 to 500,000	9¢
500,000 to 600,000	8¢
Over 600,000	7¢

Ready to Serve Charge

Size of Meter	Per Quarter	Allowing Gallons
⅝"*	$2.25	4,500
⅝"**	4.50	9,000
¾"	4.50	9,000
1"	5.00	10,000
1¼"	6.00	12,000
1½"	6.70	14,000
2"	9.50	22,000
3"	12.30	30,000
4"	16.80	60,000
6"	37.80	200,000

* Supplying one fixture.
** Supplying more than one fixture.

New Kensington, 35,000.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 1,500	$3.25
Next 10,000	20¢
" 20,000	18¢
" 20,000	15¢
" 20,000	12¢
" 200,000	10¢
" 200,000	8¢
" 200,000	6¢
" 200,000	5¢
Over 871,500	4½¢

Minimum Charges

Size of Meter	Per Quarter
½" or ⅝"	$3.25
¾"	4.50
1"	6.00
1¼"	9.00
1½"	12.00
2"	24.00
3"	50.00
4"	100.00
6"	150.00
8"	200.00

Newtown, 2,500.

Gals. per Year	Per 1,000 Gals.
First 375,000	40¢
375,000 to 750,000	34¢
750,000 to 1,500,000	22¢
Over 1,500,000	18¢

Minimum Rates

Size of Meter	Per Year
½″	$15.00
¾″ and 1″	25.00
1½″	50.00
2″	75.00

Palmerton, 8,000.

Domestic

Cu. Ft. per Year	Per 1,000 Cu. Ft.
First 15,000	$3.10
Over 15,000	2.75

Not to exceed 400,000 cu. ft. per month.

Manufacturing

Gals. per Year	Per 1,000 Gals.
First 100,000,000	5½¢
Next 100,000,000	2¾¢
Over 200,000,000	1¾¢

Minimum, $15 per year.

Pittsburgh (Wards 16, 18, 19, 20, 28, 29, 30), et al, 194,661.

Gals. per Month	Per 1,000 Gals.
First 100,000	34¢
Next 100,000	28¢
" 150,000	25¢
" 150,000	22¢
" 500,000	20¢
" 500,000	18¢
" 1,000,000	16¢
Over 2,500,000	14¢

Service Charge

Size of Meter	Per Month
⅝″*	$0.83
⅝″**	0.50
¾″	1.20
1″	2.13
1½″	4.80
2″	8.53
3″	19.20
4″	34.13
6″	76.80

* Supplying more than one fixture.
** Supplying one fixture only.

Reynoldsville, 4,000.

Gals. per Quarter	Per 1,000 Gals.
0 to 10,000	18¢
10,000 to 20,000	17¢
20,000 to 30,000	15¢
30,000 to 40,000	13¢
40,000 to 50,000	12¢
50,000 to 60,000	11¢
60,000 to 70,000	10¢
70,000 to 80,000	9¢
80,000 to 100,000	8¢
Over 100,000	7¢

Service Charge

Size of Meter	Per Quarter
½″	$1.50
¾″	2.25
1″	3.00
1½″	3.75
2″	4.50

St. Marys, 8,000.

Gals. per Quarter	Per 1,000 Gals.
First 30,000	45¢
Next 300,000	30¢
Over 330,000	13½¢

Service Charge

Size of Meter	Per Year
½″ or ⅝″	$8.00
¾″	12.00
1″	20.00
1¼″	24.00
1½″	36.00
2″	60.00
3″	96.00
4″	156.00
6″	300.00

Scottdale, 10,000.

Gals. per Quarter	Per 1,000 Gals.
First 75,000	40¢
Next 675,000	20¢
Over 750,000	10¢

Service Charge

Size of Meter	Per Quarter
½″	$2.25
¾″	3.00
1″	5.00
1¼″	15.00
2″	37.50
3″	75.00
4″	112.50
6″	225.00

Shenandoah, 30,000.

Gals. per Month	Per 1,000 Gals.
First 2,000	50¢
Excess	25¢

Service Charge

Size of Meter	Per Month
½″ or ⅝″	$0.50
¾″	1.00
1″	1.50
1½″	3.50
2″	6.00
3″	13.50
4″	24.00
6″	54.00
8″	98.00

South Fork, 6,000.

Gals. per Quarter	Per 1,000 Gals.
First 20,000	45¢
Next 40,000	35¢
" 40,000	25¢
" 50,000	20¢
" 50,000	15¢
" 100,000	10¢
" 300,000	8¢

Minimum Rates

Size of Meter	Per Quarter
½″	$3.00
¾″	4.00
⅝″	5.25
¾″	6.50
1″	9.75
1¼″ or 1½″	14.65
2″	19.50
3″	32.50
4″	57.00
6″	

Uniontown, 23,000.

Gals. per Month	Per 1,000 Gals.
First 25,000	35¢
Next 25,000	30¢
" 25,000	25¢
" 25,000	20¢
" 400,000	15¢
Over 500,000	10¢

Minimum Charges

Size of Meter	Per Month
⅝″	$1.00
¾″	2.00
1″	4.00
1½″	6.00
2″	8.00
3″	12.00
4″	16.00

Waynesboro, 11,000.

Gals. per Quarter	Per 1,000 Gals.	Total Bill
First 12,000	30¢	$3.60
Next 24,000	20¢	8.40
" 48,000	15¢	15.60
" 120,000	10¢	27.60
" 297,000	8¢	51.36
Over 501,000	7¢	

Minimum Rates and Meter Rentals

Size of Meter	Minimum per Month	Rental per Month
⅝″	$1.00	$0.50
¾″	1.50	0.60
1″	2.00	0.75
1½″	3.00	1.00
2″	4.00	1.25
3″	8.00	1.50
4″	15.00	2.50
6″	27.50	4.00

Meter rentals are charged for meters in excess of one, the rentals for the first or largest meter being included in the minimum rates.

Yardley, 1,262.

Gals. per Quarter	
First 10,000	$10.00
	Per 1,000 Gals.
Next 15,000	50¢
" 50,000	30¢
" 125,000	25¢
" 200,000	20¢
Over 400,000	20¢

RHODE ISLAND

Bristol, 13,575.
Warren, 8,000.
Barrington, 5,000.

Domestic

40¢ per 1,000 gallons. Minimum, $50 per year.

Power, Manufacturing and Commercial

Gals. per Month	Per 1,000 Gals.
First 50,000	40¢
50,000 to 75,000	35¢
75,000 to 100,000	30¢
100,000 to 125,000	25¢
125,000 to 2,000,000	17½¢
Over 2,000,000	15¢

Minimum, $1 per month.

Pawtucket, 128,000.

Gals. per Day	Per 1,000 Gals.
First 1,000	30¢
1,000 to 3,000	25¢
3,000 to 5,000	20¢
5,000 to 7,000	15¢
7,000 to 10,000	12¢
Over 10,000	10¢

Minimum, $10 per year.

Westerly, 13,000.

Minimum, $10 per year, allowing 33,750 gallons. Over 33,750 gallons per year at following rates:

Gals. per Day	Per 1,000 Gals.
First 500	30¢
500 to 1,000	27¢
1,000 to 5,000	24¢
5,000 to 10,000	18¢
10,000 to 30,000	15¢
Over 30,000	10¢

Woonsocket.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 10,000	21¢
Next 10,000	18¢
" 10,000	15¢
Over 30,000	7¢

Minimum, $10 per year.

SOUTH CAROLINA

Anderson, 26,000.

Gals. per Month	Per 1,000 Gals.
0 to 20,000	25¢
20,000 to 40,000	22½¢
40,000 to 80,000	20¢
80,000 to 100,000	17½¢
Over 100,000	15¢

Belton, 2,000.

Gals. per Month	Per 1,000 Gals.
0 to 20,000	30¢
20,000 to 30,000	27½¢
30,000 to 40,000	25¢
40,000 to 50,000	22½¢
Over 50,000	20¢

Monthly meter charge of 10¢. Minimum $1 per month, allowing 3,000 gallons.

Charleston, 90,000.

Cu. Ft. per Quarter	Per 1,000 Cu. Ft.
First 10,000	$1.85
Next 20,000	1.70
" 70,000	1.50
" 200,000	1.30
" 700,000	1.10
" 1,500,000	0.95
" 3,500,000	0.75
" 6,000,000	0.55
Over 12,000,000	0.45

Minimum Charges

Size of Meter	Minimum per Quarter	Allowance Cu. Ft.
¾″	$3.00	1,622
1″	5.00	2,700
1½″	12.50	6,760
2″	25.00	13,520
3″	50.00	28,520
4″	150.00	95,000
6″	250.00	171,154
8″	500.00	375,000

Clinton, 2,500.

Gals. per Month	Per 1,000 Gals.
1,000 to 5,000	40¢
5,000 to 10,000	35¢
10,000 to 25,000	30¢
25,000 to 50,000	25¢
50,000 to 100,000	20¢
100,000 to 200,000	18¢
200,000 to 400,000	16¢
Over 400,000	15¢

Minimum, 50¢ per month.

Florence, 13,182.

Gals. per Month	Per 1,000 Gals.
First 5,000	30¢
Next 5,000	25¢
Over 10,000	20¢

Minimum, $1 per month.

Liberty, 2,500.

Minimum, $1.25, allowing 2,000 gallons. Excess 30¢ per 1,000 gallons.

Spartanburg, 35,000

Cu. Ft. per Month	100 Cu. Ft.	Per Total Bill
First 2,500	26.7¢	$ 6.68
Next 4,500	21.4¢	16.31
" 20,000	17.8¢	51.91
" 33,000	14.2¢	98.77
" 50,000	10.6¢	151.77
" 160,000	10¢	311.77
" 730,000	9.7¢	1,019.87
" 1,000,000	9¢	1,919.87
Over 2,000,000	8¢	

Minimum Charges

Size of Meter	Per Month	Allowance Cu. Ft.
⅝″	$0.80	300
¾″	1.10	400
1″	1.60	600
1½″	3.25	1,200
2″	6.00	2,200
3″	16.50	7,000
4″	52.00	27,000
6″	110.00	70,000

Sumter, 10,000.

Gals. per Mo.	Per 1,000 Gals.	Total Bill
1,000 to 10,000	25¢	$2.50
10,000 to 30,000	20¢	6.50
30,000 to 100,000	15¢	17.00
100,000 to 160,000	12¢	24.20
Over 160,000	10¢	

Walhalla, 2,700.

Domestic

Gals. per Month	Per 1,000 Gals.
First 10,000	25¢
Next 10,000	20¢
" 10,000	15¢
Excess	15¢

Minimum, $1 per month, allowing 3,000 gallons.

Industrial

First 1,000,000	10¢
Excess	7½¢

SOUTH DAKOTA

Lennox, 1,100.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 2,000	37½¢
Next 2,000	30¢
Over 4,000	25¢

Minimum, $1.50 per quarter.

Mitchell, 10,100.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 500	70¢
Next 700	17¢
" 1,500	14¢
" 3,000	12¢
" 44,300	10¢
Over 50,000	8½¢

Minimum, $1.50 per quarter, allowing 300 cubic feet.

Sioux Falls, 33,000.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 4,200	30¢
Next 4,200	20¢
" 4,200	18¢
" 4,200	16¢
" 4,200	14¢
" 21,000	12¢
Over 42,000	10¢

Winner, 2,000.

Gals. per Quarter	Per 1,000 Gals.
First 3,000	$3.00
Next 2,000	75¢
" 5,000	50¢
" 15,000	25¢
25,000 to 100,000	40¢
100,000 to 250,000	36¢
250,000 to 500,000	32¢
Over 500,000	28¢

TENNESSEE

Clarksville, 10,000.

Gals. per Quarter	Per 1,000 Gals.
First 10,000	35¢
Next 10,000	30¢
" 10,000	25¢
" 10,000	20¢
" 10,000	15¢

Special Rates for Factories, etc.

First 30,000	24¢
Next 30,000	20¢
" 30,000	17½¢
Over 90,000	15¢
" 300,000*	15¢
" 3,000,000**	12½¢

* Minimum, $30.00 per quarter.
** Minimum, $50.00 per quarter.

Minimum Rates

Size of Meter	Per Quarter
⅝"	$3.00
¾"	4.00
1"	6.00
1½"	7.50
2"	12.50
3"	20.00
4"	25.00
6"	30.00

Cleveland, 10,000.

Domestic, 30¢ per 1,000 gallons per quarter.

Factories

Gals. per Month	Per 1,000 Gals.
First 25,000	25¢
25,000 to 50,000	20¢
50,000 to 150,000	15¢
150,000 to 250,000	12½¢
Over 250,000	10¢

Elizabethton, 10,000.

Gals. per Month	Per 1,000 Gals.
First 2,500	$1.50
Next 2,500	30¢
" 5,000	20¢
Over 10,000	15¢

Minimum Charges

Size of Meter	Per Month
⅝"	$1.50
¾"	2.25
1"	3.00
1½"	5.00
2"	10.00
3"	20.00
4"	40.00
6"	75.00

Erwin, 6,000.

Gals. per Month	Per 1,000 Gals
First 5,000	30¢
Next 5,000	27½¢
" 5,000	25¢
" 5,000	22½¢
" 15,000	20¢
" 25,000	17½¢
" 40,000	15¢
" 100,000	12½¢
" 150,000	10¢
" 250,000	9¢
Over 600,000	7½¢

Water from gravity line from spring, 20 per cent less than above.

Consumers furnishing their own meters are given a net reduction, as follows:

Size of Meter	Per Month
½" and ¾"	15¢
1"	25¢
1¼"	30¢
1½"	35¢
2"	50¢
3"	75¢

Greeneville, 7,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 300	$1.00
Next 2,000	20¢
" 3,000	15¢
" 5,000	12½¢
" 10,000	10¢
" 30,000	7½¢
" 50,000	6¢
" 100,000	5¢
" 100,000	4½¢
Over 300,300	4¢

Johnson.

Gals. per Month	Per 1,000 Gals.
First 3,000	37¢
Next 7,000	20¢
" 15,000	17.777¢
" 25,000	15.555¢
" 50,000	11¢
" 100,000	6.666¢
Balance	5.555¢

Kingsport, 15,000.

Gals. per Month	Per 1,000 Gals.
First 20,000	30¢
Next 30,000	28¢
" 30,000	25¢
" 50,000	23¢
" 50,000	20¢
" 50,000	18¢
" 100,000	15¢
Balance	10¢

McMinnville, 3,500.

Gals. per Month	Per 1,000 Gals.
First 4,000	37½¢
Next 2,000	25¢
" 4,000	20¢
" 15,000	12¢
" 25,000	10¢
" 50,000	9¢
Over 100,000	8¢

Minimum Charges

Size of Meter	Per Month
¾"	$1.50
1"	2.00
1½"	3.00
2"	4.00

Murfreesboro, 10,000.

Gals. per Month	Per 1,000 Gals.
1,000 to 3,000	46¢
3,000 to 5,000	40¢
5,000 to 7,500	35¢
7,500 to 10,000	28¢
10,000 to 25,000	23¢
Over 25,000	17¢

Nashville, 152,000.

Cu. Ft. per Quarter	Per 100 Cu. Ft.
First 1,000	$1.50
1,000 to 2,000	14¢
2,000 to 5,000	13¢
5,000 to 15,000	12¢
15,000 to 35,000	11¢
35,000 to 75,000	10¢
75,000 to 120,000	9¢
120,000 to 240,000	8½¢
240,000 to 360,000	8¼¢
360,000 to 480,000	7⅞¢
480,000 to 600,000	7½¢
600,000 to 720,000	7⅛¢
720,000 to 840,000	6¾¢
840,000 to 960,000	6⅜¢
Over 960,000	6¢

Newbern, 2,000.

Gals. per Month	Per 1,000 Gals.
First 5,000	25¢
Next 5,000	20¢
" 10,000	15¢
Over 20,000	10¢

Monthly service charge, 50¢.

TEXAS

Alice, 5,000.

Gals. per Month	Per 1,000 Gals.
First 2,000	$1.50
Next 2,000	60¢
" 6,000	40¢
" 10,000	30¢
Excess	25¢

Amarillo, 39,500.

Gals. per Month	Per 1,000 Gals.
First 10,000	50¢
Next 10,000	45¢
" 80,000	40¢
" 400,000	35¢
" 500,000	30¢
Over 1,000,000	25¢

Minimum for meters 1" and under, $1.50 per month, including 3,000 gallons.

Service Charge

Size of Meter	Per Month
1½"	$3.50
2"	5.00

Bartlett, 2,000.

Domestic

Gals. per Quarter	Per 1,000 Gals.
First 6,000	$4.00
Next 20,000	40¢
" 20,000	30¢
Excess	20¢

Industrial, 20¢ per 1,000 gals.

Burkburnett, 5,300.

Minimum, $2 per month, allowing 1,000 gals. 3,000 gallons, $3.00. Excess 25¢ per 1,000 gallons.

Cotulla, 3,100.

Gals. per Month	Per 1,000 Gals.
First 10,000	$1.50
10,000 to 20,000	10¢
20,000 to 30,000	9¢
30,000 to 40,000	8¢
Over 40,000	7¢

Dallas, 290,000.

Gals. per Month	Per 1,000 Gals.	Total Bill
First 10,000	30¢	$3.00
Next 10,000	27¢	5.70
" 10,000	26¢	8.30
" 10,000	25¢	10.80
" 10,000	24¢	13.20
" 10,000	22¢	15.40
" 10,000	21¢	17.50
Over 70,000	21¢	

Industrial rate, 17½¢ per 1,000 gallons if monthly consumption through one meter averages 1,000,000 gallons.

Denton, 15,000.

Gals. per Month	Per 1,000 Gals.
First 10,000	40¢
Next 10,000	35¢
" 10,000	30¢
" 20,000	25¢
" 50,000	20¢
Over 100,000	15¢

Minimum, $1 per month, allowing 333 cubic feet.

Eagle Pass, 6,000.

Gals. per Month	Per 1,000 Gals.
First 3,000	$1.75
Next 2,000	25¢
" 10,000	15¢
" 20,000	12¢
Over 35,000	10¢

Eastland, 9,560.

Gals. per Month	Per 1,000 Gals.
First 4,000	50¢
Over 4,000	25¢

Filtration plant fund, 25¢ per month. Sewer maintenance fund, 25¢ per month. Toilet fee, 50¢ per month.

Galveston, 50,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 125	50¢
Next 10,000	20¢
Over 10,125	14¢

Goliad, 3,000.

Gals. per Month	Per 1,000 Gals.
First 4,000	$2.00
Next 4,000	35¢
" 4,000	30¢
Excess	25¢

Lancaster, 1,200.

Domestic

Gals. per Month	Per 1,000 Gals.
First 2,000	75¢
Next 5,000	50¢
Excess	35¢

Commercial
(Over 15,000 gallons)

First 2,000	75¢
Excess	25¢

Minimum, $1.50 per month.

Lubbock, 10,000.

Gals. per Month	Per 1,000 Gals.
First 3,000	$2.00
Next 2,000	50¢
" 5,000	25¢
" 10,000	20¢
" 40,000	18¢
" 100,000	16¢
Over 160,000	15¢

Martin, 5,000.

Gals. per Month	Per 1,000 Gals.
First 30,000	30¢
Next 70,000	25¢
100,000 to 200,000	20¢
Over 200,000	15¢

Mineral Wells, 10,000.

Gals. per Month	Per 1,000 Gals.
First 2,000	50¢
Next 20,000	30¢
" 20,000	25¢
" 20,000	20¢

Minimum, $1 per month.

Paris, 18,000.

Cu. Ft. per Month	Per 100 Cu. Ft.
First 1,000	25¢
Next 2,000	22¢
" 2,000	20¢
" 5,000	15¢
" 40,000	12¢
" 50,000	10¢
Over 100,000	8¢

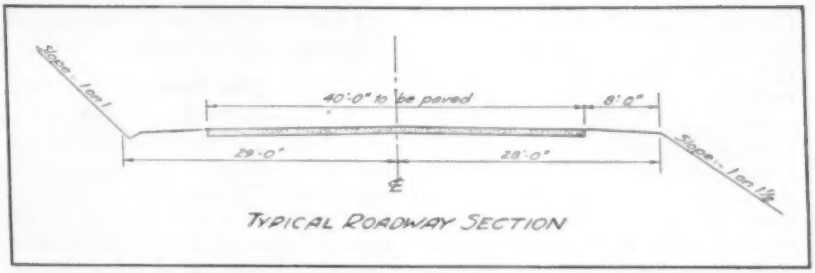
(To be concluded in the December issue)

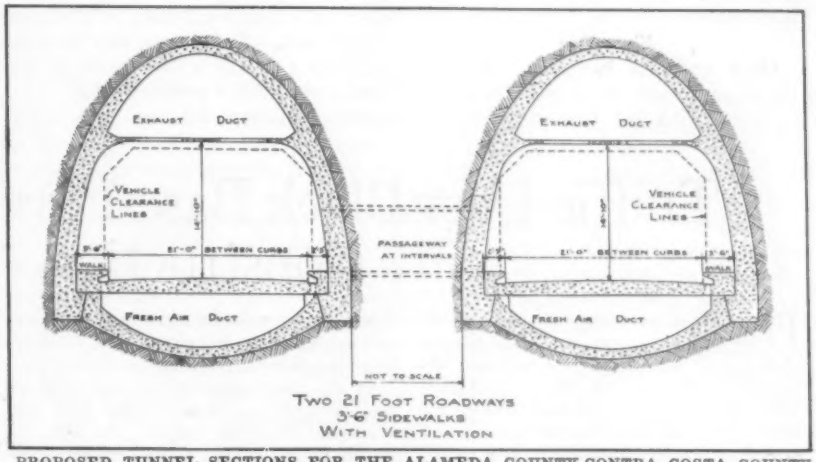
Cooperation Breaks a Rocky Barrier

By GEORGE E. POSEY
COUNTY SURVEYOR, ALAMEDA COUNTY, CALIF.

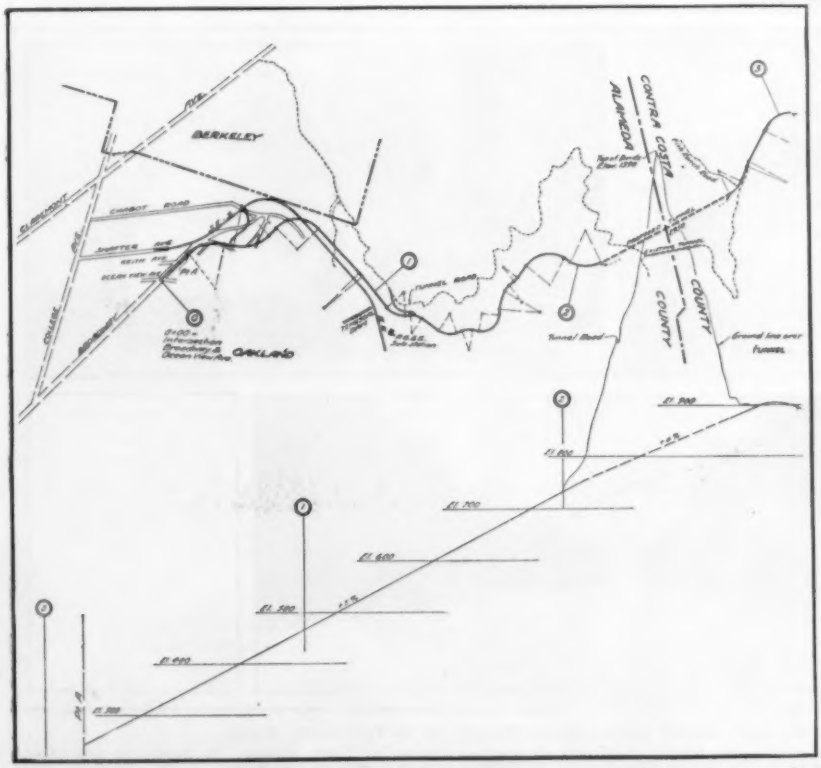
FOR nearly three years, Alameda County and Contra Costa County, Calif., have been working hand in hand to remedy the traffic situation interposed by the Contra Costa hills, which separate the two communities. It was almost three years ago that the two counties and the city of Oakland joined in creating a joint tunnel engineering commission charged with the duty of investigating, surveying and collecting data regarding tunnels through which traffic might flow out from Oakland and Berkeley and in from the prosperous farming communities on the other side of the hills. The extension of the project will furnish a new short, direct road to Stockton and will open up to more easy communication the rich agricultural and industrial area centering in the upper San Joaquin Valley and afford a new route of travel from the bay region to all interior California.

The joint tunnel commission is composed of George N. Randle, City Engineer of Oakland, R. R. Arnoll, County Surveyor of Contra Costa County, George A. Posey, County Surveyor of Alameda County, and John R. Graham and Harry G. Butler.





PROPOSED TUNNEL SECTIONS FOR THE ALAMEDA COUNTY-CONTRA COSTA COUNTY HIGHWAY



A SECTION OF THE PROPOSED ALIGNMENT AND PROFILE OF THE ALAMEDA COUNTY-CONTRA COSTA COUNTY HIGHWAY AND TUNNEL

Traffic Situation Serious

From the start the traffic problem was seen to include more than merely the goings and comings of Alameda and Contra Costa County people. The necessity for San Francisco to find its outlet to the Sacramento and San Joaquin Valleys very largely through Alameda County meant that the tunnel would have to have such connections that traffic to and from the city across the bay could flow through it without congesting or interfering with local travel. This again brought up the whole question of traffic arteries in Oakland and Berkeley. The tunnel commission, however, did not duplicate the work of the Traffic Committee of One Hundred of Oakland and recommend what arteries should be opened, but laid out all its routings over existing streets.

The investigation developed two outstanding routes, either of which the commission believed would meet all present needs. These routes were the Temescal Creek or Tunnel Road and the Shepherd's Canyon route. Both lead to the same key position at Walnut Creek, but on the west they lead into the East Bay cities over widely different routes. From the seventeen possible

combinations of tunnel and approach which were developed, projects known as C and E were finally recommended by the commission. These, as shown by the accompanying plan and profile, lead by easy grades down Temescal Creek Canyon, across the San Francisco-Sacramento Railway, over Temescal reservoir, past the Claremont Country Club and down Montgomery Street to Broadway in Oakland on the one hand; and on the other diverging from the main approach road at a point in the canyon, across a bridge over Temescal Creek and roughly paralleling the San Francisco-Sacramento Railway along the steep slopes along the north side of the creek below Tunnel Road, from which the new route diverges gradually and passes below Roble Court to an entrance in Berkeley.

Financing

Once sentiment had been united on the single project as the most advisable all-round plan for present work, the commission met with the Alameda County supervisors, who answered their plea by creating a road and tunnel fund of half a million dollars from which they definitely pledged a quarter of a million dollars as a nucleus for tunnel construction. The money is to come out of the county's share of the state gasoline sales tax. Contra Costa County was invited to join the project through the formation of a highway district.

The Tunnel

The approved tunnel begins at a point below and almost directly to the east of the portal of the present highway tunnel. The elevation on the Contra Costa side is 934 feet and, if the proposed grade of 4.8 per cent is used, the tunnel length will be 2,290 feet and its western portal will have an elevation of 821 feet. This portal will be considerably west and a little north of the west portal of the present tunnel. The approach road would hold to a 5 per cent grade on the west side and possibly a slightly lower one on the east side. This eastern approach is short and curves almost directly from the mouth of the tunnel into the Fish Ranch road, the entire approach being only about 300 feet long.

The engineers, in laying out the tunnel, endeavored to hold to the 5 per cent maximum grade throughout and to eliminate virtually all the curves involved in using the present tunnel, including the long hairpin turn at the eastern entrance. The road, the engineers say, will be a high-gear road throughout.

The tunnel would cost $727,000 for a single bore, and with its connection to Broadway it will cost $1,946,000. As the engineers contemplate duplication of the tunnel at a later date by adding another bore to take care of the additional traffic which time will bring, estimates also were made for that, bringing the cost up to $2,740,000.

Traffic Uses Black Base Pavement During Construction

DURING the construction of the all-asphalt pavement on Third Avenue, Hutchinson, Kansas, traffic was not deprived of the use of the thoroughfare, which is one of the principal ones of the city. After construction of the 3½-inch asphaltic concrete base, and prior to the laying of the 1½-inch sheet-asphalt wearing surface, vehicles were permitted to drive over the base course. No ill effect whatever was suffered by the base.

In the construction of the sheet-asphalt wearing-surface, a long-handled lute was employed after the rakers. The lute, as shown in one of the accompanying illustrations, has the appearance of a very large rake, except for the fact that instead of teeth it has a straight edge. The lute smoothes out the asphalt mix with a greater degree of perfection than is possible with rakes, thus making an improved riding surface. Third Avenue is 64 feet wide, including two-foot gutters. The work was done by J. H. Shears' Sons.

CONSTRUCTION OF THE NEW SHEET ASPHALT PAVEMENT IN HUTCHINSON, KANS.

1. Traffic using the 3½-inch asphalt base prior to laying the Texaco sheet asphalt wearing surface on Third Avenue. 2. Spreading and raking the sheet asphalt material on the black base. Note the use of the lute or float after raking to insure greater smoothness. 3. The completed black base and sheet asphalt pavement on Third Avenue

Will That New Industry Be of Real Benefit to Your City?

A Discussion of Industrial Development and Its Effect on Municipal Utilities

By EDMUND B. BESSELIEVRE, MEM. AM. SOC. C. E.

MUNICIPALITIES are frequently faced with the desirability of encouraging new industries to locate in their midst. In many cases the civic organizations have committees whose duty it is to make overtures to new industries. On the other hand, industries frequently voluntarily signify their desire to locate in a given center, and solicit concessions of land, remission of taxes, etc., to lighten their financial burden.

It is extremely important that any municipality which is faced with either condition, and which has decided that it is desirable to have industrial plants in its boundaries, should be cognizant of several factors that may seriously affect local financial arrangements. These factors it is the author's purpose to enumerate, and they should be carefully considered, weighed and discussed before any commitment is made to invite the new plant or to meet its demands.

The primary objects of any municipality in soliciting or encouraging the construction of new industrial plants are:

a. Larger population
b. Employment for existing population not otherwise engaged
c. Increased municipal revenues, taxes, water rents, etc.
d. Increased business for local merchants
e. Increased freight shipments to induce better rail service
f. Increased volume of mail to bring better postal facilities
g. Increased bank deposits
h. Advertising value given by distribution of local products
j. Recognition by highway and other state departments for improved roads, etc.
k. Increased property valuations, giving greater bonded limits and permitting extensive local improvements

Any one or all of these may be excellent reasons for encouraging new industries to locate in a given municipality, but there is another and more critical phase of the question which is entirely disregarded in the average case, or is never thought of. In each case the question should be asked: *Can we afford it?*

A large industry applying to a community for possible sites for a plant may dazzle the eyes and judgment of the municipal authorities and civic bodies by the apparently overwhelming advantages of the location of its plant in that place. Let me here disclaim any inference that the managers of industry do this with intent to deceive or becloud the issue. They do not. They simply fail to appreciate one point—the possibility that both parties may not benefit—and they should be willing to meet a municipality half-way in considering this problem.

The basic point of this paper is to determine whether the municipality can furnish with its present utilities the necessary service that will be required by the industry, or whether the demands of the plant in question so exceed all present capacities that it will require complete or extensive revamping of these utilities at enormous expense.

A large industry can, and usually does, pay a heavy tax bill, unless in its eagerness the municipality has given tax immunity. It will employ large numbers of people daily, whose earnings will be circulated among the local merchants, whose savings will be deposited in the local banks, and whose daily output will increase the shipment of freight, express and mail. All of these bring money to a town and its local merchants and interests.

On the other hand, there are certain industries that require very extensive facilities, such as large volumes of water, electric power or sewer capacity. Others discharge polluting liquid wastes which may be detrimental to health and property, others are noisy or emit obnoxious fumes or odors which would render them a nuisance in or adjacent to residential districts.

The Water Problem

Not infrequently an industry requires an unfailing daily supply of clean water in great volume. In many cases in the author's experience this demand has been greater than the entire normal consumption of the town itself. Furnishing, or agreeing to furnish, this supply might easily mean the necessity for locating new sources of supply, frequently at a distance, entailing a very heavy expense in laying pipe lines to bring the water to the city. It may entail a new or enlarged filtration plant, if very clear or soft water is required.

Depending upon the site selected by the industry, it may mean the rebuilding of the entire distribution system in order to place this large volume at the plant, even if the volume of the city's supply is sufficient to meet the needs of the plant. Industrial plants of large size usually locate on the outskirts of cities, and unless the city has been laid out on a predetermined plan with the location of industries in mind—and few cities have been so planned—it will be found that in almost every case extensive alterations and revisions of the water

Analyzing the Pros and Cons

This is an industrial and commercial era and nothing should be done by municipalities that will unnecessarily hinder the expansion of industry, the construction and growth of industrial plants, or the development of business districts and communities.

On the other hand, it is equally important that the bulk of the population not directly concerned with any given industrial plant and the residential sections of municipalities be protected against indiscriminate invasion. It is an economic principle that should be self-evident that industry should not interfere with public comfort or convenience by reducing the standard of living, increasing the cost of living, or imposing unreasonable financial burdens upon a municipality or its residents.

The object of this paper is to assist municipal officials and commercial and civic organization executives in determining the real value of an industry to a community. Intelligent consideration of all the factors involved is required, and a rule or yardstick for measuring values that may be applied to determine the selection or exclusion of industrial plants is essential.

E. B. B.

distribution system must be made to deliver the required volume. In those cities where there are separate systems for normal use and fire protection, each system requires extension.

The Sewerage Problem

A plant employing a large number of hands will present a problem in the handling of its sewage. In the odd case where such a plant is located on the banks of an already polluted stream, the disposition may be a simple matter. But those cases are few and becoming fewer all the time. It can easily be appreciated that a large plant located on the outskirts of a city, at the end of the sewerage system, might easily impose a sewage load as great or greater than the original load of the entire city. To cope with this situation and prevent epidemic, it would be necessary to provide an entirely new system of laterals, trunks and interceptors to carry the increased volume.

Many small communities have recently built sewage treatment plants designed to handle the sewage of their normal populations, without thought of the heavy increase in load that a large industrial plant would impose. Throwing this excess amount of sewage into a plant might easily make it useless, upsetting all the plans of the designer and interfering with the biological processes employed, and make the plant a failure and a nuisance. Additions could be made to take care of this additional load, but this requires time and expenditure of large amounts, and during the construction period serious offense could be given to the inhabitants of the city.

In many cases it may happen that the sewer system is adequate to handle the increased volume, and the sewage treatment plant may also be able to handle the increased amount of sewage solids contributed by the employees, but many industries discharge highly polluted wastes in large volumes. Unless located directly on a watercourse into which they can discharge such wastes, long and large pipe lines must be provided for carrying these wastes, or they must be carried in the sewer system. Before a blanket promise is made by a municipality to handle the discharged waters from an industrial plant, serious consideration must be given to their quality. If the wastes are practically clear water, the extra volume may not seriously interfere with the sewage works, but frequently the waste waters carry polluting elements which may be a menace to health, destructive of aquatic life and detrimental to animal life, vegetation or property, in addition to ruining the stream for recreational purposes. In such cases a plant to treat these wastes may be required, usually at no small expense. If taken into the city sewer system and treatment plant, such wastes in many cases destroy the usefulness of the plant by filling the tanks with inert solids, rendering them ineffective, or if the wastes carry disinfecting chemicals, the bacterial processes upon which the plant depends may be entirely inhibited.

One case in the writer's experience of such an outcome is of very recent origin. In this case a city had completed a modern, well-designed sewage plant and had put it into operation. Two large and important industries had located in the city, and, through lack of foresight, had been assured that their wastes would be handled by the city plant. One of these plants discharged a large volume of liquid wastes carrying a great percentage of heavy, inert solids, which settled out in the sedimentation units, causing them to fill up and become ineffective. The second plant discharged a large volume of chemically charged wastes which destroyed the bacterial life necessary to the biological process employed and rendered the plant ineffective. Extensive alterations are being made at large expense, but the city is having to bear the burden.

Other Factors Needing Consideration

An industrial plant may pass all requirements as to water-supply, sewerage facilities, waste discharges, etc., but may still be a detriment. Noxious or disagreeable fumes or odors may ruin a residential district, cause injury to health, destroy vegetation and property. In selecting sites for industrial plants, careful attention should be given to the direction of the prevailing winds, so as to carry away as much as possible all odor nuisance.

An industrial plant may easily double the population of a city, thus necessitating revision of the transportation facilities, supplies of gas, electric current, telephones, and postal deliveries, and may interfere with zoning laws and ordinances, city plans and park layouts.

It can readily be appreciated that a new industry which would invite additional population to the city would consequently throw an additional burden upon the school facilities, entailing expenditures for new buildings, enlarged

QUESTIONNAIRE

Information for Location of Industrial Plant

Name of Company ..... Address of Main Office .....
Name of managing official ..... Title .....
Name of Chief Engineer or Superintendent .....
Nature of product .....
Volume of product ..... daily ..... monthly ..... annually .....
Unit of production ..... pound ..... ton ..... gallon ..... piece ..... etc.
Number of plants now in city making same product .....
Normal number of employees (factory) ..... men ..... women .....
Normal number of employees (office) ..... men ..... women .....
Hours of employment .....
Volume of water required per day ..... Maximum hourly rate .....
Character of water required ..... soft ..... filtered .....
Is waste water discharged cold or hot ..... approx. temperature .....
Approximate volume of water discharged ..... daily ..... max. per hour
Will waste water contain any of following ingredients? Indicate by check and give volume of ingredient contained:

Acid	kind	strength	
Alkali	kind	strength	
Grease	kind		
Hair		Fiber	
Dirt	sand	gritty substances	
Organic solids		fecal matter	
Disinfectants			
Chemicals		kind	
Colors		shade and type	
Dyes		shade and type	
Iron		Other minerals	

Name any other ingredient not listed above which may be prejudicial to health or life of human or animal or destructive to property if discharged into water-courses or to the sewage plant .....

Volume of sewage discharged daily .....
Number of toilets .....
Amount of electric current required ..... kwh. per day ..... peak rate .....
Characteristics of current desired ..... A C ..... DC .....
Voltage desired ..... Name peak demand period of day .....
Telephone requirements ..... number of trunks ..... number of extensions .....
Volume daily mail ..... First Class ..... Parcel Post .....
Volume express daily ..... weight ..... pieces .....
Is air mail used? ..... approx. weight per day .....
Volume freight shipped daily ..... total weight ..... pieces .....
Volume freight received daily ..... total weight ..... pieces .....
Will side tract or spur be required? ..... length ..... no tracks .....
Will crane be required? ..... capacity ..... tons .....
Amount fuel required daily ..... oil ..... coal ..... gas .....
Fire protection required .....
Will plant have own fire stations and apparatus? .....
Is visible smoke discharged from stacks? .....
Does smoke contain odorous ingredients? ..... How high will smokestack be? .....
Is plant operation quiet? .....
Are live animals handled? ..... Is slaughtering done on the premises? .....
Disposition of dry waste products .....
Are dry waste products odorous? .....
Area required for plant ..... acres ..... approx. dimensions of site .....
Average weekly factory payroll ..... men ..... women .....
Would local banks be utilized for company's financial operations? .....
Approximate cost of immediate construction contemplated .....
Is company now organized and operating? .....
Will stock or bonds be offered for sale locally? ..... Amount .....
Are products for local consumption or for shipment elsewhere? .....
Are raw materials obtained locally or imported? .....
Name raw materials (if expedient) and amount of each required .....
Is it necessary to dry products in open air or is entire operation under cover? .....
Name nearest plant of similar kind .....

Signed .....
.....

facilities and equipment. In turn, larger numbers of children would necessitate a survey of the existing playground and recreational facilities of the city, perhaps making it necessary to increase these, with consequent large expenditure of funds for land and equipment. Increased population will undoubtedly cause the enlargement of the public safety and public health agencies of the city, particularly if the character of labor required by tl e industry in question is that of the type of manual labor whose social environment is not on a high plane.

It is logical to assume that a municipality is justified in reasonable extensions to its public works to take care of new sections or demands, but economic limitations would soon rule out complete rebuilding of utility plants and distribution systems to take care of single industrial plants.

An industrial establishment might entirely destroy a residential section by bringing into it a large number of people of a social class different from the existing residents, or by making the streets undesirable or unsafe by the passage of heavy trucks or busses, electric cars or other means of transportation.

A large industrial plant will undoubtedly be a heavy taxpayer, thus contributing large sums to the municipal treasury, but it is doubtful that in any case the extra taxes received would compensate for the interest, amortization and carrying charges of the increased public works. Therefore, the burden would be distributed over the entire tax-paying public, and in many cases the advantages of the increased revenue would not outweigh the extra cost to the individual.

If a new industry attracts new workers to a city, these workers and their families will, of necessity, require adequate housing. If available housing is not sufficient and the type of employee required is such that individual homes are desired, this may result in the establishment of an entirely new residential district, with its consequent influx of tax payments to the city. These might easily repay the city for any additional extensions to utilities that might be required.

Checking Up on Industrial Prospects

It is a relatively simple matter to control the selection of industrial plants and it would seem to be self-evident good policy for any municipality to investigate carefully these phases of industrial problems.

All applications from industrial plants for available sites, or solicitations sent out by civic organizations with a view to inducing industries to come to a given municipality should be passed upon by a committee or board before any commitments are made which involve expense on the part of the town. This committee or board should be composed of representatives of civic bodies, such as chambers of commerce, boards of trade, the various service clubs, banking interests and at least two representatives of the municipality, preferably the head of the public works or equivalent department and the city engineer.

This committee should formulate a questionnaire and insist upon all points covered in it being fully answered by the responsible head of the industry involved. A suggested form of questionnaire is appended, but local conditions would of course govern its use, and often would necessitate changes.

There is a place for every industrial plant where it may expand and develop to the best advantage in accord with its needs and possibilities, and where its expansion or location will not impose uneconomic or undue burdens on any one. Selective distribution of industrial plants with a view to the greatest good for the greatest number and with the economic interest of each party in mind will produce more satisfactory results than can be the case where plants are allowed to locate without check or supervision. On the one hand, harmony will be the rule, and on the other constant friction and complaint will ensue. Such investigation as the author suggests has already borne fruit in one community by restraining over-enthusiastic elements from bringing into that town industries which calm deliberation shows would have brought dissatisfaction. It is a principle which has been sadly neglected, and its adoption by communities in general cannot fail to result in ultimate good.

The Advantages of the Smaller City

"THERE is no valid excuse for a community to be anything but a happy place to live in," writes Thomas C. Powell, President of the Chicago and Eastern Illinois Railway Company, in *Nation's Business* for September.

"Those people are fortunate who live in or adjacent to communities having populations ranging from 50,000 to 100,000. There is no longer any oppressive isolation. These places are just as much in touch with each other and with the world as the great cities can hope to be. The many comforts of American life are equally available, no matter what the size of the community. . . . But as cities become larger, happiness disappears and we have in its place excitement, turmoil, sickness, disorder, extravagance and a continual change of location, all of which contribute to the general state of mind which is called 'a struggle for existence.'

"To enjoy the fruits of their labor, men and women require plenty of light, abundant water, uncontaminated air, quick communication, and, through all these, opportunity of social contact and higher education.

"Communities should be classified, not according to population, but according to those things which make them suitable and attractive places to live in. A city under an honest and capable city government, backed by the alert citizens of the community, should have:

(a) Pure water
(b) Complete sewer system
(c) Well-paved thoroughfares properly maintained
(d) Good schools, including a technical school
(e) Fair taxes evenly distributed
(g) Good public library system supplementing the school system
(h) Parks and an artistic spirit strong enough to keep them clean and orderly
(i) A proper building code enforced to protect the appearance of the city and create a low insurance rate
(j) Good churches

"All these advantages can be obtained much more effectively in a small city than in a large one, mainly because there can be greater personal contact between the individual members of the community.

"Every industrial community should maintain a research bureau to bring to the attention of its business and professional men the opportunities for investment and development which are suitable for the section they live in. It is entirely possible for the small city to encourage such a diversity of industry and such valuable working conditions as to build up a community that will make an impression upon the rest of the country. With a multiplicity of products there is bound to be a more uniform prosperity. . . .

"Besides the advantages to the manufacturer, the attractions of a community of from 50,000 to 100,000 people are manifest when considered from the standpoint of the employees. It is not within everyone's capacity to maintain a place in the country and to continue business in the city. In the smaller communities, these two may be combined so that through the modern system of financing home building those of moderate income may enjoy the benefits of community contact and at the same time may reap all the benefits of the social life of the suburban communities."

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Sewer Program Will Permit Stifled City Growth to Become Normal

By ALEX VAN PRAAG, JR.
WARREN AND VAN PRAAG, CONSULTING ENGINEERS, DECATUR, ILL.

FOLLOWING a period of years during which it has suffered from repeated flooding of sewers and expensive sewer repairs, as well as the retarding of a program of subway construction and the stifling of certain industrial development, the city of Decatur, Ill., is now undertaking an extensive program of sewerage development.

The situation at Decatur is particularly interesting when it is understood that the city has been enjoying a substantial growth in area and population for the past forty years, and that during that period of rapid though substantial development its sewerage problem has been almost totally neglected, with the exception of extending lateral service to large areas. This neglect of its sewerage system does not apply to the disposal of sewage, for a Sanitary District created in 1917 has undertaken the problem of sewage treatment, and the matter of sewage disposal is well in hand, the Sanitary District having constructed an excellent system of intercepting sanitary sewers and a modern sewage disposal plant.

The Sewerage System

Decatur's system of combined sewers has four principal outlets into the Sangamon River. Before entering the river, the main sewers are intercepted by a sewer through which the sanitary sewage is conducted to the treatment plant of the Sanitary District.

The main sewer outlets, especially those serving the business and commercial areas of the city and the major portion of the residential area, were constructed from thirty to forty years ago. Their construction was the result of a then comprehensive report on sewerage, prepared and submitted to the city in November, 1884, by Benzette Williams, consulting engineer, of Chicago. The report of Mr. Williams was of course responsible for the first comprehensive sewer plan, and it predicted a future expansion of the sewerage system to include an area of 1,759 acres. The present city corporate limits enclose an area of approximately 4,800 acres.

Of particular interest in the Williams report, which is still to be found on file, penned in long-hand, is the warning to the city that the sewerage system then proposed was designed with the assumption that storm water would be retarded in its entrance into the sewers and ponded in the streets in order to prevent the sewers from being gorged by storm water. In fact, the report invites attention to the necessity of limiting catch-basin connections to the sewer, to sewers of 6 inches diameter, and the limiting of the number of connections from catch-basins to one for each block.

It is surprising that the sewers constructed upon the recommendation of Mr. Williams have afforded sufficient facility to permit rapid expansion of the city's growth without earlier embarrassment to the sewerage system. The inadequacy of the system has been felt, however, since 1915 to 1920. Engineers studying the sewerage problem in 1920 invited attention to the haphazard construction of the city's sewers and, after making a preliminary survey of the situation, recommended that a comprehensive and thorough study of the sewerage problem be made, with a view to a broad plan of sewer relief for the city and surrounding area.

Later Studies

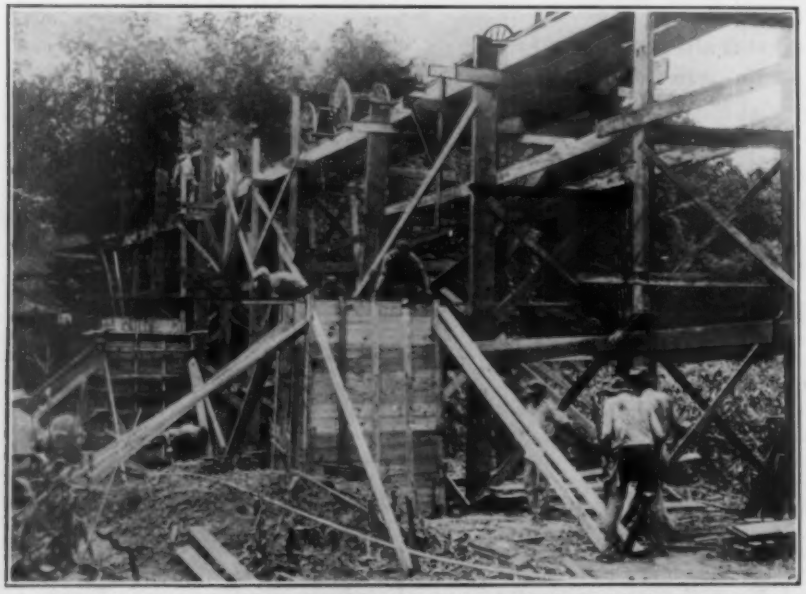
The engineer's report in 1920 resulted in the adoption of a general plan of sewerage in 1924. The report of the engineers in 1924 was the result of extensive studies as to flooding conditions, rainfall data and imperviousness factors, and indicated the general method for the collection and disposal of sewage for the entire city and surrounding areas. The report was general in its character and did not enter into the detailed design of the sewers to serve any particular district. It suggested merely the boundaries for the several districts, the approximate capacities which would be required to meet the ever increasing development for a reasonable period of years, and the type of sewers best suited to the area needs.

Construction in 1925

Following the engineer's report in 1924, the city had plans prepared, and placed under construction during 1925 a system of combined sewers costing approximately $440,000 and known as the North Side sewer improvement. It was designed to serve a rapidly developing residential area of 525 acres and involved the construction of sewers ranging in diameter from 12 to 72 inches.

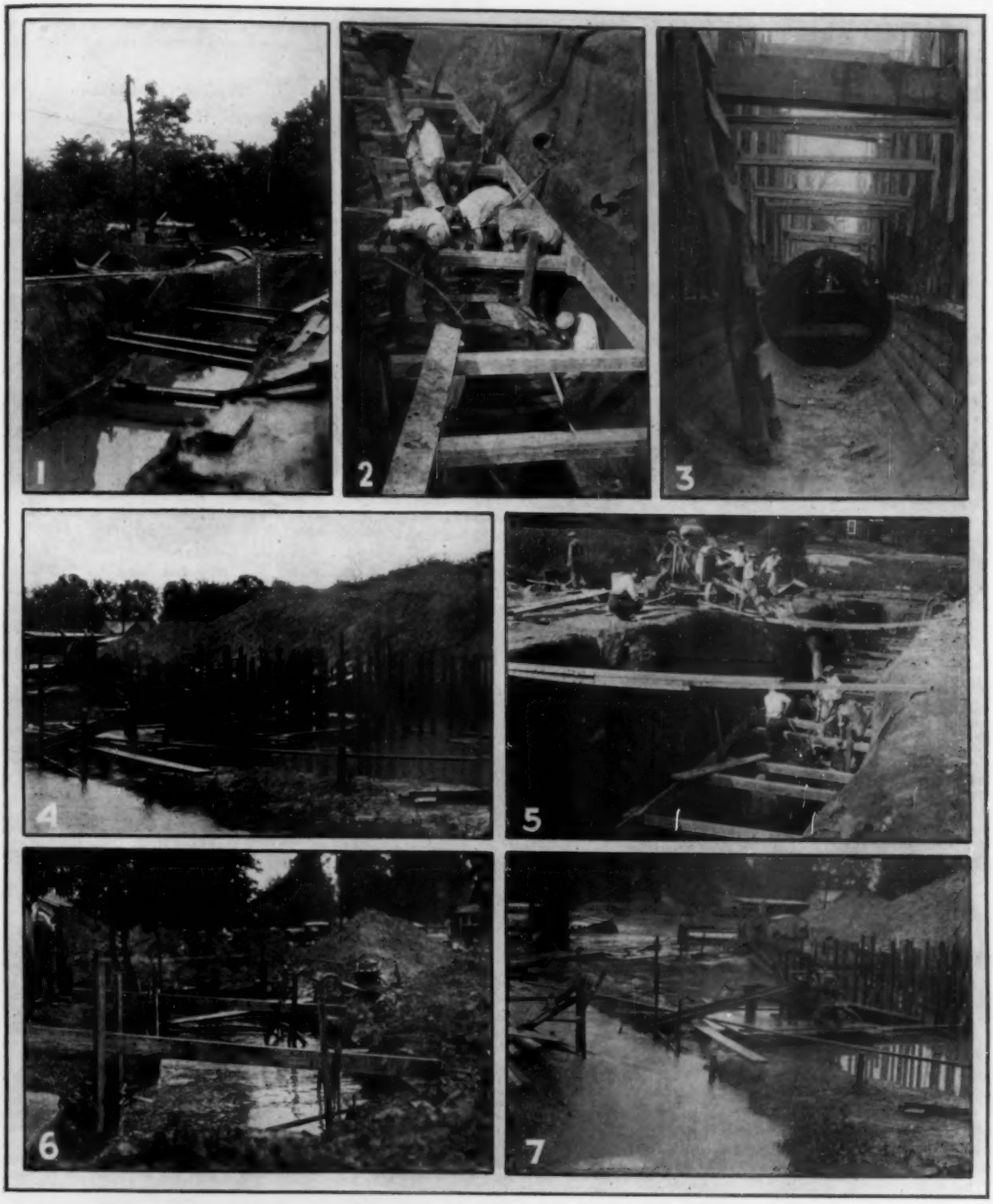
Present Construction

During the summer of 1929 a second major improvement was started with the construction of the Southeast sewer system. This system of sewers, similar to the North Side system, is designed to serve also a rapidly develop-



PREPARATION FOR THE CONSTRUCTION OF A TRESTLE STRUCTURE IN THE SOUTHEAST SEWER SYSTEM AT DECATUR, ILL.

The structure is of reinforced concrete, 250 feet in length and 20 feet high. The barrel of the sewer is to be an integral part of the overhead spans. Note two of the form piers in place and the elaborate preparations necessary for building the structure



SCENES DURING THE CONSTRUCTION OF THE NORTH SIDE SEWER IN DECATUR

A 72-inch monolithic concrete sewer trench after rains in July, 1926. Ground water at this point during dry seasons but few feet below the surface. 2. Building a sewer arch on the 69-inch monolithic sewer. 3. A section of completed invert on the 42-inch monolithic sewer with the inside forms set to receive the crown. 4. Heavy rains took possession of the sewer excavations near the site of the pumping-station. Note the surface stream at the left and the flat area in the background where the water ponded. 5. The 69-inch sewer, showing the ground crew and the working arrangement for placing concrete. 6. Construction of a 42-inch sewer handicapped by flooding following heavy rains. At this location the ground water stood within a few feet of the surface during dry seasons. 7. More trouble from flooding

ing residential district, covering 1,200 acres. The estimated cost of this project is approximately $680,000. The system involves the construction of 15 miles of sewers ranging in diameter from a minimum of 8 inches to a maximum of 84.

Future Work

A third and major improvement which it is anticipated will be placed under construction in January, 1930, has been planned and is now going through the necessary legal steps preliminary to construction. It is known as the Central Relief sewer improvement. This is

to be a system of large-diameter sewers which will serve as relief for the present system of sewers, which are badly surcharged at frequent intervals. The area served by the proposed Central Relief sewer improvement comprises 2,300 acres. It includes the entire business or commercial center of the city and the major industrial areas, as well as a large acreage of the most densely built-up residential areas. A tabulation of the areas served, according to classification, is as follows: commercial, 200 acres; industrial, 300 acres; railroad, 200 acres; residential, 1,600 acres.

The proposed sewers will range from 24 to 108 inches in diameter and in addition there will be constructed a rectangular box sewer section having inside dimensions of 10 by 12 feet. In all, there will be 12.2 miles of relief sewers constructed, of which 9.7 miles will be in open cut construction and 1.8 miles will be of tunnel construction. Seven-tenths-mile will consist of reconstructing a present trunk sewer that is practically in a state of collapse, by building within the present sewer a new sewer of smaller diameter.

The proposed relief sewers are designed to meet the requirements of the area served for a period of fifty years, and will be financed by a special assessment against the benefited property. The estimated cost of the proposed improvement is $2,145,570.38.

Plans for Fifty Years

In planning the proposed relief sewers it has been necessary to make a very detailed analysis of the probable demands upon the sewer system in the next fifty years, because the areas to be improved are already densely built-up, and any proposed construction must be of such character that it will readily serve the areas in the future. As the commercial area continues to expand and the sewered area becomes more and more impervious, thus ever increasing the load upon the sewerage system, the sewers must serve without the necessity of repeated extensions and repairs which would prove so costly in the densely built-up area.

Prior to the preparation of the detailed plans for the proposed improvement, an extensive survey was conducted to ascertain the location, size and grade of all the existing sewers within the area served. The collection of these data was imperative, as the proposed new sewers will incorporate within the system wherever possible the existing sewers, all of which are to be utilized to their fullest extent. In order to ascertain this information, several months were spent in digging up and examining the existing sewers, because the records of sewer construction were almost nil. Whenever of sufficient size to admit a man, the sewers were actually entered and examined from the inside.

The preliminary studies included also a thorough study of the rainfall records of the vicinity, covering a period of twenty-five years. These records were studied jointly with surveys of the extent of the impervious areas, which were determined in many cases by actual measurement over large sections.

With an extended knowledge of the existing sewers, combined with a thorough study of the imperviousness characteristics of the areas and the rainfall records, the system of sewers was finally designed, using the rational method now commonly employed in the design of storm-water sewers in large cities.

Type of Construction

In general, the sewers will be of concrete construction including both reinforced pre-cast concrete sewer pipe and monolithic concrete sewer construction. Sewers will be of vitrified segment sewer blocks where constructed in tunnel and of diameters of 72 inches and less. Monolithic reinforced concrete construction will be used in tunnel on one section of the sewer where the internal diameter is 108 inches and the length of sewer approximately 1¼ miles.

Flooding of Sewers to End

The construction of the Central Relief sewer improvement when completed will permit of the free use of the sewer system, so that flooding of sewers will occur approximately once in ten years, and will also permit of the expansion of the city's subway program. It will eliminate the expensive sewer repairs which the city has been subjected to during the past five years. It will in addition serve industrial areas so that their development will be no longer retarded. The improvement is the largest single improvement ever undertaken by the city, and its construction has been delayed until a time when the demands for improvement are great and the public realizes the necessity of improvement without further delay.

The plans for the system of sewers have been prepared under the direction of Warren & Van Praag, Inc., consulting engineers, of Decatur, Ill.

Recommendations for City and County Regulation of Aircraft

A NEW aeronautics bulletin, available October 1, presenting a revised city or county aeronautics ordinance and uniform field rules for airports, has been completed by the United States Department of Commerce.

The proposed ordinance and supplementary field regulations were originally presented in THE AMERICAN CITY for May of this year at the time they appeared in "Domestic Air News," No. 48, published by the Aeronautics Branch of the Department of Commerce.

The new bulletin, entitled "Suggested City or County Aeronautics Ordinance and Uniform Field Rules for Airports," goes into the problem of uniformity in aeronautical regulations more fully than "Domestic Air News," and also contains several changes in the text of the suggested requirements.

A new section has been inserted in the suggested ordinance, reading as follows:

"Section 2. No aircraft shall be operated over or within the jurisdiction of said —— in violation of the Air Traffic Rules which have been or may hereafter be established by said Secretary of Commerce of the United States."

Minor changes in wording have been made in several of the ten field rules published in the May issue of THE AMERICAN CITY and these additional rules have been added in the new bulletin:

"Only aircraft and airmen licensed by the Secretary of Commerce of the United States shall operate on or over the airport; provided, however that this restriction shall not apply to public aircraft of the Federal Government, or of a state, territory, or possession, or of a political subdivision thereof, or to aircraft licensed by a foreign country with which the United States has a reciprocal agreement covering the operation of such licensed aircraft. [In cases where the matter is covered by state legislation or by county or municipal ordinance, this rule will not be necessary.]

"No person shall navigate any aircraft over, land upon, or fly the same from, or service, maintain, or repair any aircraft on the airport, or conduct any aircraft operations on or from the airport otherwise than in conformity with the requirements of the Air Commerce Regulations established by the Secretary of Commerce under the authority of the Air Commerce Act of 1926.

"The Air Traffic Rules as established by the Secretary of Commerce under the authority of said Air Commerce Act of 1926, are hereby adopted by reference and made a part of these rules.

"No person shall use the airport as a base or terminal for the carrying-on of commercial aviation, or the carrying of passengers, freight, express or mail, or for student flying, communications, or other commercial or private purpose or transportation without first securing a permit from the —————— and paying the fees and charges prescribed for such privileges, the use of the airport, its facilities, and for services rendered.

"Witnesses of and participants in accidents on or near the airport shall be requested to report to the administration office as soon after accidents as possible, leaving their names and addresses and rendering such reports as may be required.

"All repairs to aircraft and engines shall be made in the spaces designated for this purpose and not on the area reserved for landing and taking off.

"Each major hangar and shop building shall be provided with a first aid kit containing at least twelve assorted bandages, twelve sterile dressings, two tourniquets, a supply of first aid dressings for burns, adhesive tape, a supply of either tincture of iodine or mercurochrome, aromatic spirits of ammonia, and either a glass cup or a supply of paper cups.

"The term 'person' as used herein shall be construed to include any person, firm, copartnership, corporation, association, society, or club, singular and plural."

The bulletin contains also the suggested rules for flying, landing, taking off, and taxiing, running engines, instruction flying and test flights, parking and mooring areas, dead line, etc., fire regulations, and penalties.

How the Cincinnati Department of Buildings Conducts Its Work

By C. M. STEGNER
DIRECTOR OF BUILDINGS, CINCINNATI, OHIO

TO secure public safety and to promote the general welfare of the community in connection with the erection and occupancy of buildings is the twofold purpose of the Cincinnati Department of Buildings. The intention, of course, is not to replace the legitimate services of lawyers, surveyors, architects and building superintendents, but to safeguard the public when an owner has neglected to employ such services, or when he has entrusted these responsibilities to incompetent people.

The general organization of the Department of Buildings—the number of employees in each division and their monthly salaries—is shown in Chart No. 1. The members of the Board of Plumbing Examiners, of the Zoning Board, and of the Board of Moving Picture Operator Examiners are independent, but function through the Department of Buildings. The Department's budget includes the salaries of the members of these boards and all other board operating expense. The boards are coordinated with the Department of Buildings through the Director, who serves on each of them without extra compensation.

Chart No. 2 depicts the average number of inspections per man per month for the various inspection divisions of the Department. This is done for 1926, 1927 and 1928.

Smoke Division

The Smoke Division is concerned primarily with fuel combustion equipment. Plans and specifications for all boilers and furnaces must be approved by the mechanical engineer of this division before a building permit is issued. The actual construction must also be passed upon favorably by inspectors of the Smoke Division. Observations are also made on the operation of all equipment, both old and new. Violations of the smoke ordinance are investigated and are ordered to be corrected either by more intelligent firing, by changes in the grade of fuel, or by reconstruction of the furnace. Repeated violations are followed by arrest and court prosecutions. Closely allied with the Department of Buildings in this work are the Smoke Abatement League of the Community Chest and the Cincinnati Railroad Operating Committee. Voluntary compliance with the smoke abatement law is now the general rule in Cincinnati, and the violator is an exception.

General Building Inspection

The General Inspection Division is responsible for all work in connection with general building inspection except housing, plumbing, elevators, electrical and mechanical equipment. These branches of work are in charge of specialists in other divisions of the Department. Under the present system of weekly inspections for each building operation, the first inspection of the General Inspection Division checks up on the location of the structure in regard to zoning. The next inspection is on the foundation work; the next on first floor construction; then on first-story walls; then, second-floor framing followed by second-story walls, etc., until the work is completed. Structural features of larger buildings involving expert engineering knowledge are looked after by assistant structural engineers, who also instruct and help the general inspectors in making their weekly inspections.

The increased average number of general inspections per man per month for 1927 and 1928 over 1926 is due primarily to a change of system whereby the city, covering an area of 72 square miles, is divided into small districts within which the inspectors' daily operations are confined. This diminishes the travel between jobs, whereby reducing the time and expense of transportation. By covering each district once a week the inspector can accomplish more than under the old system of inspection with longer distances between jobs. Cincinnati was the first city to inaugurate this system of weekly build-

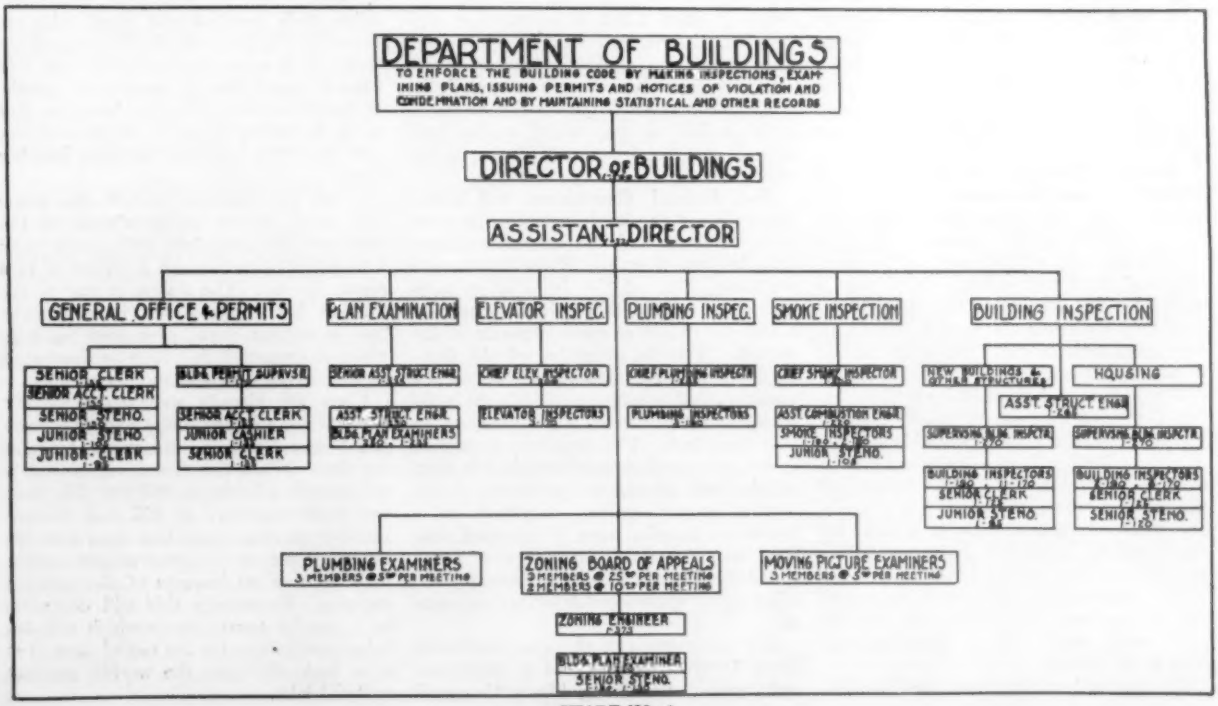


CHART NO. 1

ing inspection for general construction work.

This method of weekly inspections has proved very satisfactory to the Department, the builders, and the public. Most violations are due to ignorance or carelessness of the builders, so that for them the Building Department's inspection is educational and instructive. A detection of violations early in the construction period makes their correction an easy and inexpensive matter through verbal instruction from the inspector. The number of inspections shown on the chart does not include inspection of all permits for building construction by the Police Department, which is constantly on the alert for building operations that are being done without a permit.

Housing Division

The Housing Division is concerned chiefly with the slum tenements, which usually are old buildings that have been converted into multi-family dwellings without decent living facilities. Such buildings, together with the poverty, ignorance and carelessness of the tenants, constitute a menace to any progressive community. Cooperating with the Department of Buildings in this work are the Better Housing League and the Shoemaker Health

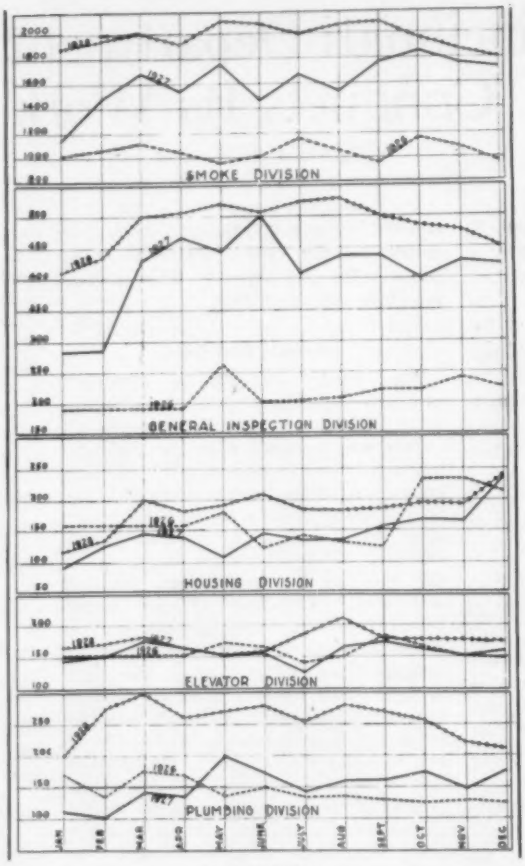


CHART NO. 2

and Welfare Center of the Cincinnati Community Chest.

Elevator Division

Elevator inspection is a routine job but an important and exacting one, covering the inspection of every elevator in the city twice each year. In most cases this work must be done without undue interference with the business operations of the owner.

Plumbing Division

The plumbing division recorded a creditable improvement in inspections per man per month during 1928 under new leadership and a 50 per cent reduction in the plumbing inspection division. Under the old system the inspectors worked but half a day. This had a demoralizing influence on the entire office. After this was eliminated, the total number of all departmental inspections in 1926 was doubled in 1928 with corresponding improvement in the work.

Through better coordination the office work has been improved to reduce materially the period of time required from the filing of an application to the issuing of a permit. The entire department, with no increase in number of employees, is now operating on an efficiency basis that will stand comparison with the best industrial management.

A Model Town to Look Out Upon the World's Greatest Artificial Lake

A NEW type of frontier town, to be built on the brink of the Colorado River, for the housing of the workmen who will construct Boulder Dam, is being planned by the Department of the Interior as a model community which is expected to live after the construction period has passed.

Secretary Wilbur and Elwood Mead, Commissioner of Reclamation, selected the site for this town when they visited the Colorado early in the summer. It is on the Nevada side of the river on the nearest level land and a little more than a mile from the dam site. They have often conferred regarding the project since that time, and experts are working on details of the town plan.

The new model community will be located at a point where Black Canyon widens out and affords a favorable setting. The dam itself will be a mile away over a chaos of broken hills. The bottom of the canyon where the work must begin and where the greater part of it must be done, will be at a level 1,600 feet below the rim and the town. Into the bottom of the great canyon there will go every day a thousand men who will emerge again when their work is done and return to the town.

The task of lowering these men into the canyon and bringing them out again presents in itself a bit of spectacular engineering. It will be accomplished through the installation of huge elevators which will lift their pasengers a perpendicular 1,000 feet, which is practically twice as great a lift as that which carries passengers to the top floors of our tallest skyscrapers.

The Federal Gvernment will retain ownership of the land on which the town is to be built, and will lease it to those who live on it or use it for commercial purposes. One of the features of these leases will be that they will continue only under the period of good behavior of the tenant. It is the intention of the Government that the bootlegger or other law violator shall not interfere with the well-being of its workmen while assigned to this huge task. The power to terminate leases, and therefore residence, in this town will be used as one of the means of enforcing proper conduct. Instead of a boisterous frontier town, it is hoped that here simple homes, gardens with fruits and flowers, schools and playgrounds, will make this a wholesome American community.

The construction of the great works at Black Canyon will require a period of eight years. Something like a thousand workmen will be constantly employed. With their families and those who are drawn to the dam site by the general activity, it is estimated that this town will have a population of some 4,000 people. It should be borne in mind, however, that there is no employment at present nor will there be any for, perhaps, another year.

When the reservoir is full, the water will come up the valley almost to the town, and the great lake will stretch away a hundred miles through a region of rare scenic beauty. The region is one of admirable healthfulness and it is thought that a popular resort may grow up here when the reservoir has been so developed as to provide its incidental attractions.

Plans are already well developed for construction of automobile highways from Las Vegas, Nev., and Kingman, Ariz., to the dam. When the dam is completed, it will become a bridge as well and link these two roads together. It will then become possible to come past this dam and see the reservoir on a transcontinental trip with little or no increase of the distance traveled. Eventually this will doubtless be a popular tourist route which will develop possibilities for the model town that is to look out upon the world's greatest artificial lake.

Hydrant Rentals and Sprinkler Charges—Part III

A Study of Rentals for Private and Public Fire Hydrants in Various Cities with Data on the Charges Made for Connections for Private Standpipes and Sprinkler Systems

Hughesville, Pa.

The Hughesville Home Water Co. charges $25 each per year for private fire hydrants and the following annual rates for permanent hose connections:

¾″	$5.00
1″	10.00
2″	15.00

For automatic sprinkler fire service connections the rates are:

8″	$150.00
6″	75.00
4″	50.00
3″	30.00
2″	15.00

New Kensington, Pa.

The following annual minimum rates are charged for private fire protection by the Kensington Water Co.:

2″ tap in street main	$60.00
4″ tap in street main	120.00
6″ tap in street main	200.00
8″ tap in street main	300.00
Each standard fire hydrant	45.00
Each hose opening, 2½″ or less	25.00
Each sprinkler head	0.05

The consumer shall be entitled to the number of hydrants, hose connections or sprinkler heads indicated by the charge for the size pipe employed and all over this number will be charged at the regular schedule rate, except that where fire service is permitted through the same service line and meter as that providing water service, the regular minimum meter charge shall apply. When the charge for water amounts to double the minimum quarterly rate for the meter employed, no additional charge will be made for fire protection service.

Palmerton, Pa.

The Palmer Water Co. makes the following annual charges for fire protection:

Connection with sprinkler equipment	$15.00
Standpipe for fire protection in building when not supplied through a meter	5.00 per outlet
Public fire hydrants	18.75 each
Private fire hydrants	18.75 each

St. Marys, Pa.

Annual private fire protection charges made by the St. Marys Water Co, are:

2″ service line	$60.00
3″ service line	96.00
4″ service line	156.00
6″ service line	300.00
Hose connections (including fire hydrants)	20.00
Sprinkler heads	0.05

The charge for hose connections or sprinkler heads is made only in case it amounts to more than the service charge, in which case it replaces the service charge. When fire-protection fixtures are on the same service line as the regular water-supply, only one service charge will be imposed. Any excess charge for hose openings or sprinkler heads will be as above.

Public fire hydrants are billed at $45 each per year.

Scottdale, Pa.

For each public fire hydrant, a charge of $2.50 per quarter is made and for each mile of pipe line 3 inches in diameter and above in the fire district, the Citizens Water Co. charges $112.50 per quarter.

Private fire hydrants are billed at $7.50 per quarter for each standard 4-inch hydrant and $3.75 per quarter for each hose opening not in excess of 2½ inches.

Vandergrift, Pa.

For private fire protection the Vandergrift Water Co., makes the following monthly charges:

For each fire plug of not over 2 streams capacity	$5.00
For sprinklers other than fire plugs:	
2″ connection	$2.50
4″ connection	10.00
6″ connection	25.00

Minimum, $5 per month.

For public fire protection, $9 each per year is charged for fire plugs of not over two hose connections, standard size, plus $300 per year per mile of 4-inch or larger main.

Waynesboro, Pa.

Public and private fire hydrants are billed by the Waynesboro Water Department at $15 each per year. For automatic sprinkler service, a charge of 0.25 cents per square foot of floor space, is made for the first 200,000 square feet and 0.15 cents for each additional square foot. No charge is made for water used in extinguishing fires, but all water passing the detector meter installed by the city, due to leakage, use or waste, must be paid for at regular meter rates. Where there is no sprinkler service, the following annual rates apply:

1″ service pipe	$10.00
2″ service pipe	25.00
3″ service pipe	50.00
4″ service pipe	100.00
6″ service pipe	200.00

Wilkinsburg, Pa.

The Pennsylvania Water Co., which serves Wilkinsburg and twenty other municipal divisions, charges $350 per year per mile of distribution system 4 inches in diameter and larger and $8 each per year for public fire hydrants.

For private fire protection, the annual service charges, based on the size of service connection are as follows:

1½″	$15.00
2″	25.00
3″	50.00
4″	100.00
6″	200.00
8″	400.00
10″	600.00
12″	900.00

Charleston, S. C.

The annual rates for special private fire service for fire use only are as follows:

1″ attachment	$15.00
1½″ attachment	25.00
2″ attachment	35.00
3″ attachment	40.00
4″ attachment	50.00
6″ attachment	150.00

When this service is used to supply an automatic sprinkler system exclusively, a charge of not more than $50 will be made.

Aberdeen, Wash.

The monthly ready-to-serve charges for fire protection, either metered or flat rate, are as follows:

1½″ service	$1.50
2″ service	2.00
3″ service	2.50
4″ service	3.00
6″ service	5.00
8″ service	7.00
10″ service	10.00

These rates are for premises obtaining all or the major portion of their water from the city. For premises where water is not obtained from the city, the following monthly rates apply:

1½″ service	$3.50
2″ service	5.00
3″ service	7.00
4″ service	9.00
6″ service	15.00
8″ service	21.00
10″ service	30.00

Kelso, Wash.

No charge is made for water used in extinguishing fires or testing the service if the owner or occupant gives notice of such fires to the water department. The monthly charges for fire protection service are as follows:

1½″ service	$50.00
2″ service	60.00
3″ service	75.00
4″ service	100.00

City fire hydrants are billed at $4.50 each per month.

Wenatchee, Wash.

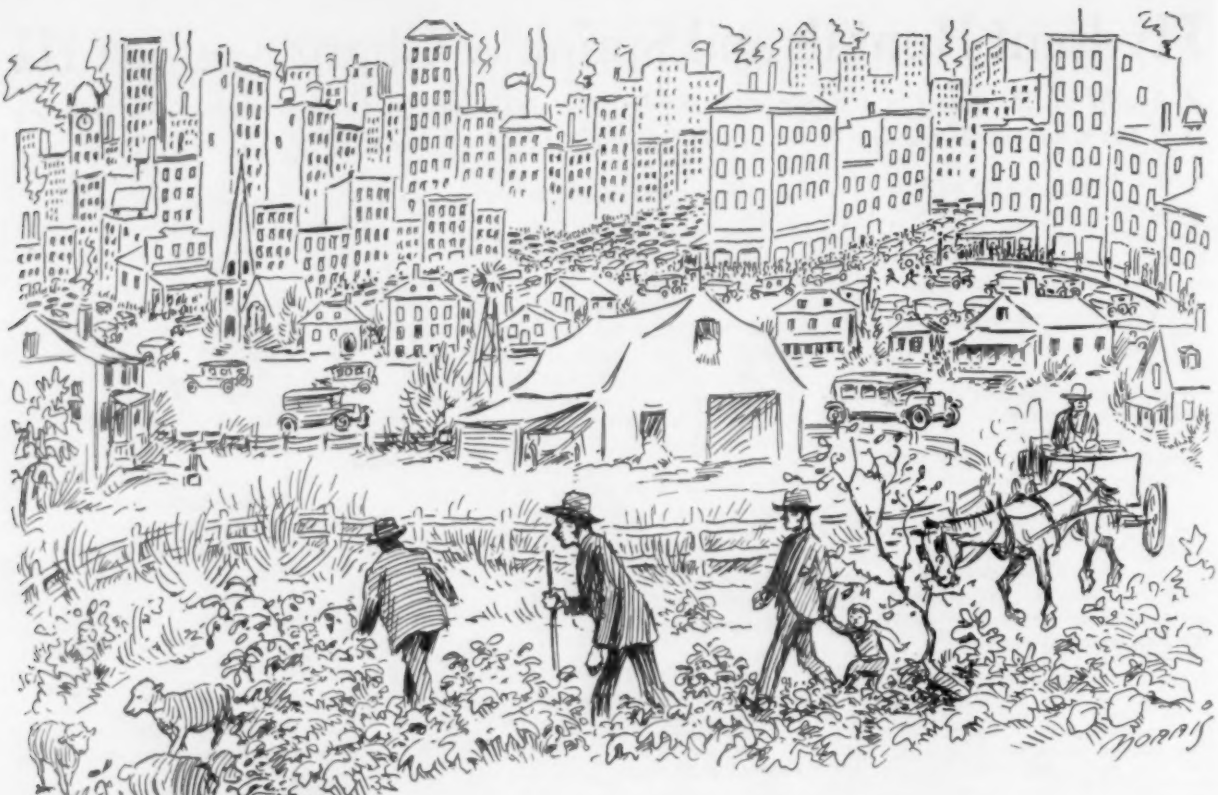
Fire service is furnished within the city limits with no charge for the water used. Meters and services are installed at the expense of the user, and an annual ready-to-serve charge for fire protection is made as follows:

2″ meters	$5.00
3″ meters	10.00
4″ meters	15.00
6″ meters	30.00
8″ meters	50.00

Yakima, Wash.

No charge will be made for water used in extinguishing fires if the owner or occupant of the premises where the fire occurs notifies the water department within 10 days. The monthly charge for fire protection service is as follows:

2″ service	$3.00
3″ service	4.50
4″ service	6.00
6″ service	9.00
8″ service	12.00



Drawn by MORRIS for THE AMERICAN CITY

The Calf-Path

By SAM WALTER FOSS

I

One day through the primeval wood
A calf walked home as good calves should;
But made a trail all bent askew,
A crooked trail as all calves do.
Since then three hundred years have fled,
And I infer the calf is dead.

II

But still he left behind his trail,
And thereby hangs my moral tale.
The trail was taken up next day
By a lone dog that passed that way;
And then a wise bell-wether sheep
Pursued the trail o'er vale and steep,
And drew the flock behind him, too,
As good bell-wethers always do.
And from that day, o'er hill and glade,
Through those old woods a path was made.

III

And many men wound in and out,
And dodged and turned and bent about,
And uttered words of righteous wrath
Because 'twas such a crooked path;
But still they followed—do not laugh—
The first migrations of that calf,
And through this winding wood-way stalked
Because he wobbled when he walked.

IV

This forest path became a lane,
That bent and turned and turned again;
This crooked lane became a road,
Where many a poor horse with his load
Toiled on beneath the burning sun,
And traveled some three miles in one.
And thus a century and a half,
They trod the footsteps of that calf.

V

The years passed on in swiftness fleet,
The road became a village street;
And this, before men were aware,
A city's crowded thoroughfare.
And soon the central street was this
Of a renowned metropolis;
And men two centuries and a half
Trod in the footsteps of that calf.

VI

Each day a hundred thousand rout
Followed this zig-zag calf about
And o'er his crooked journey went
The traffic of a continent.
A hundred thousand men were led
By one calf near three centuries dead.
They followed still his crooked way,
And lost one hundred years a day;
For thus such reverence is lent
To well-established precedent.

VII

A moral lesson this might teach
Were I ordained and called to preach;
For men are prone to go it blind
Along the calf-paths of the mind,
And work away from sun to sun
To do what other men have done.
They follow in the beaten track,
And out and in, and forth and back,
And still their devious course pursue,
To keep the path that others do.
But how the wise old wood-gods laugh,
Who saw the first primeval calf.
Ah, many things this tale might teach—
But I am not ordained to preach.

—From "Whiffs from Wild Meadows," used by permission of the publishers, Lothrop, Lee & Shepard Co., Boston, Mass.

Spaciousness in the City Plan—Its Economic and Civic Importance—I

From a Paper Prepared for the Annual Convention of the American Society for Municipal Improvements, October, 1929

By HAROLD S. BUTTENHEIM
EDITOR, THE AMERICAN CITY

AT the very time in world history when motor transportation, by highway and by air, is making the spacious city a physical possibility, the anomaly confronts us of increasingly intolerable congestion in skyscraper and apartment house construction. Man has learned that, by taking thought, he can add many cubits to his structures. Can he, by taking more thought, add spaciousness to their surroundings? Or must he be strangled by an economic Frankenstein of his twentieth century civilization? To think through some phases of this problem is a challenging task.

Before attempting to discuss present conditions and possible remedies, the accompanying definition is submitted in which I have attempted to set forth, in brief phrases, the ideals of The Spacious City.

If a Yes or No vote could determine whether future American cities shall be like *that*, is it conceivable that a single negative ballot would be cast by any one of intelligence in whom public spirit is the dominant motive? I believe not; but I can imagine that negative votes would be so cast by many in whom economic motives outweigh intelligence or concern for the public welfare. Such persons, no doubt, we shall always have with us—and their hard heads may be needed as a shock absorber for the vibrations of soft hearts. But he spoke wisely who said that he feared not so much the uprisings of the radicals as the downsittings of the conservatives—and to arouse the latter to a higher degree of public spirit and economic intelligence may be an effort worth while.

The Spacious City of the Future

A city where sunlight and air are given a fair chance to perform their joyous and health-giving functions; where there are grass and trees to delight the eye and temper the summer heat; where playgrounds are near and safe for every child; where the adult has fields for play and parks for rest; where every school has a spacious site; where the single-family dwelling is the prevailing type; where the zoning ordinance requires ample open spaces for the homes and apartments of every economic group; where skyscrapers do not crowd each other, but provide unstolen daylight for every tenant; where the gridiron is not the only planning pattern, but where streets are narrow or broad, curving or straight, as best adapted to topography and use; where there are parkways and forest reserves for pleasure travel; where owners of department stores and theaters provide for their patrons ample facilities for automobile parking; where grade separation at railroad crossings and at intersections of major highways makes safety greater and traffic congestion less; and where the benefits of spaciousness are never set at naught for selfish or shortsighted ends, but are maintained and enhanced for the welfare and happiness, present and future, of the entire community.

Are We Short of Land to Live On?

Does anyone imagine that we have city congestion because of an actual shortage of land in America? A few figures from the New York and Chicago Regions will give a sufficient answer.

The recently published report on "Population, Land Values and Government"—Volume 2 of the Regional Survey of New York and Its Environs—discusses present and future conditions in a metropolitan region housing at present about 10,000,000 persons. Five wards on the lower East Side of Manhattan have an average density of 125 families to the acre; but, contrasted with this excessive concentration, there is enough land not yet built upon within the boundaries of New York City itself to add over 2,500,000 to the present city population, without raising the density rate on these new areas above 7 families to the acre, which is about the present average for the 297 square miles of the city as a whole. If we consider not the city, but the metropolitan region with its 5,528 square miles, including the city and its environs, we find an average density of about 1,800 persons to the square mile, or considerably less than one family to the acre. What need is there to repeat in the outlying sections the congestion of the lower East Side?

Turning to the Chicago Region, we find a land area of 7,817 square miles, embracing 15 counties, with a total population (in 1920) of 3,858,618, 70 per cent of it within the limits of Chicago. This gives America's second city an average density of less than five families per acre; Cook County an average of a little more than one family per acre; and the entire Region (including Chicago) an average of considerably less than one *person* for each acre. The Chicago Regional Planning Association's report on "Trends of Population in the Region of Chicago," by Helen R. Jeter (published in 1927), from which these figures have been compiled, predicts a total population of 6,914,400 for the Region in 1950. But that will be an average of less than 900 persons to the square mile, or less than 1½ *persons* to the acre. What need here for crowding human beings together in certain favored—or ill-favored—spots at the rate of *100 or more families* to the acre?

Building a Hypothetical City

Let us assume a congested city occupying a circular area of one-mile radius. Such a circle contains 2,010.6 acres; let us say 2,000 for easy computation. (See the black center of Fig. 1.) If only 40 per cent of the total area were used for dwellings, and if the average density were 100 families per acre, the area so used would house 80,000 families, or, say, 360,000 people, in this circle of 3.1416 square miles in area. But let us assume sufficient sanity to regard such a density for the entire residential area as unthinkable; and let us see what effect an extension of the city's boundaries will have.

The simple fact is too often overlooked that the area of a circle increases not in proportion to the distance from the center to the circumference, but in proportion to the square of that difference. Add only one mile to the radius of our hypothetical city, thus doubling the distance from the center to the circumference, and we multiply the area by 4. We can then house our 360,000 people on 40 per cent of the city's area at an average density of only 25 families to the acre. But suppose we don't stop there, but realize that with the automobile and the bus and a properly planned street system a 3-mile radius from the center to the boundary of a city is easily negotiated. The

square of 3 being 9, our original area of 2,000 acres jumps to 18,000 acres, and we can house our 360,000 people at an average density of about 11 families to the acre.

This computation still assumes that only 40 per cent of the area of the city is used for residence purposes. If we assign 20 per cent to commerce and industry, and the remaining 40 per cent to streets, parks, watercourses, parkways, playgrounds, public buildings, school sites and other public open spaces, we may assume a reasonable degree of spaciousness if the whole be properly planned.

But maybe we then decide that we want to have a million people, instead of 360,000, as customers for our stores and banks and theaters. What benefit —other than the imagined glory of mere bigness—this would be to the great majority of the people already in our city, no one has yet discovered. But suppose the pressure of our downtown landowners and business interests seems too strong to resist. Must we abolish the very spaciousness which has given our city its charm, and has made its center so accessible for business and recreation? What folly it would be to grow upward or inward too much, when there is still ample room to grow outward! Two more miles of radius at the outside of the circle will bring our total area up to 50,000 acres, and—still using only 40 per cent of the land for housing—we can add 640,000 to our population and preserve an average density of about 11 families per net acre of land actually used for residence purposes.

In such a city some of the residents will live, by choice or economic necessity, in multi-family houses. Still others will wish—and can afford—to live more spaciously than 11 families to the acre. Estimating, as we have done, 4½ persons per family, we have in our million population 222,222 families living within 5 miles of city hall, and occupying 20,000 acres of land—40 per cent of the total city area. The table at the bottom of this page shows how they might divide up.

This takes care of our million people in a little less than the allotted 20,000 acres, with no greater density anywhere in the city than 60 families to the net acre, and with the great bulk of the people living in one- or two-family homes at an average density of only 12 families to the acre.

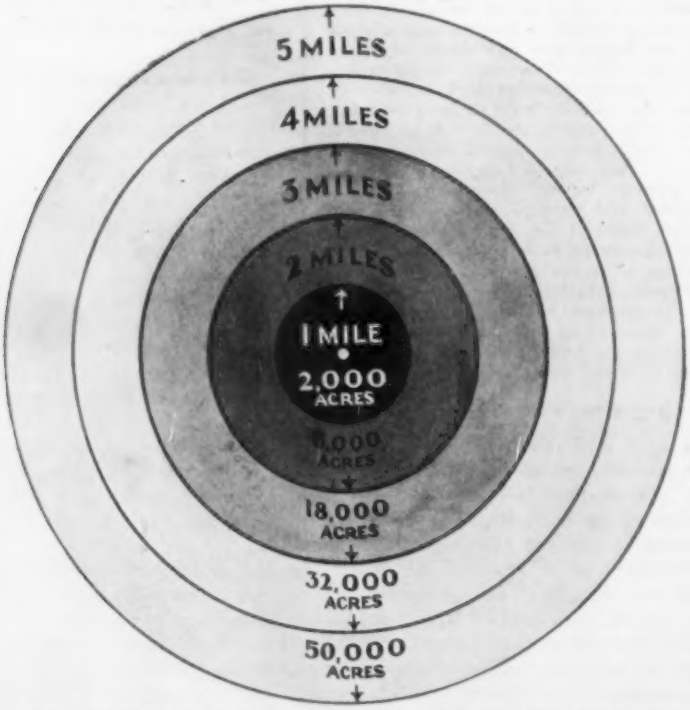


FIG. 1. HOW A CITY GROWS IN ACREAGE AS ITS BOUNDARIES SPREAD

The table below shows how a million people could be housed, without overcrowding, on 40 per cent of the area of our hypothetical city. In computing the acreage in the above diagram, even thousands are used for ready comparison. If exact figures were used, there would be still more room for parks and playgrounds

Number of Families		Average Density		Total Acres
200	families in large estates	10	acres per family	2,000
500	" of near aristocrats	2	" " "	1,000
1,000	" of less " "	1	" " "	1,000
2,000	" of the upper middle class	1/5	" " "	400
10,000	" in apartment houses	1/20	" " "	500
10,000	" " " "	1/30	" " "	333
10,000	" " " "	1/40	" " "	250
10,000	" " " "	1/50	" " "	200
10,000	" " " "	1/60	" " "	167
168,522	" " small 1- or 2-family houses	1/12	" " "	14,044
222,222	" total population about 1,000,000 persons			19,894

Imagination and Boldness Needed

Is there any economic need, even in a city of a million people, for crowding any part of the population together at a rate exceeding 60 families, or at the most, 80 families, per net acre? I am sure there is not, if we may assume effective zoning laws and a rational system of taxation. It is repeatedly alleged that the housing of 100 or more families to the acre in downtown areas is necessary because of high land values; but let us not confuse cause and effect. The truth is that a high asking price for land desired for apartment house development, in comparison with land for one- or two-family houses, results either from the fact that congestion is permitted, or because the land in question is better suited for business than for housing development. Why not display some imagination and civic courage in this matter? If a city were to adopt 60 families to the acre as its maximum density for future buildings, can it be doubted that the result would be of immense benefit to its citizens for all time to come? And by spreading rather than concentrating land values, would not all landowners benefit except the few who might otherwise fatten to the community's detriment?

"Nothing Gained by Overcrowding!"

Important studies which prove the economic soundness of spaciousness in land development have been made by leading city planners and architects in both Europe and America. One of the early publications on this subject was the monograph, "Nothing Gained by Overcrowding!" by Raymond Unwin, the noted English town planner. From the third edition of this monograph, published in 1918, Henry Wright, of New York, has recently adapted two of Dr. Unwin's contrasting plans of congested and spacious development. (See Fig. 2.) On this 10-acre tract, although Scheme "B" shows only 63 lots as contrasted with 127 in Scheme "A," Mr. Wright's figures, based on American costs, show that a 5-acre park has been provided in Scheme "B" at an increased capital cost of only $148 a lot.

The results of similar studies by Mr. Wright and by Arthur C. Holden, John Taylor Boyd, Jr., and others, are available in numerous articles published during the last two years in *The Architectural Record*, THE AMERICAN CITY, and other publications. The *National*

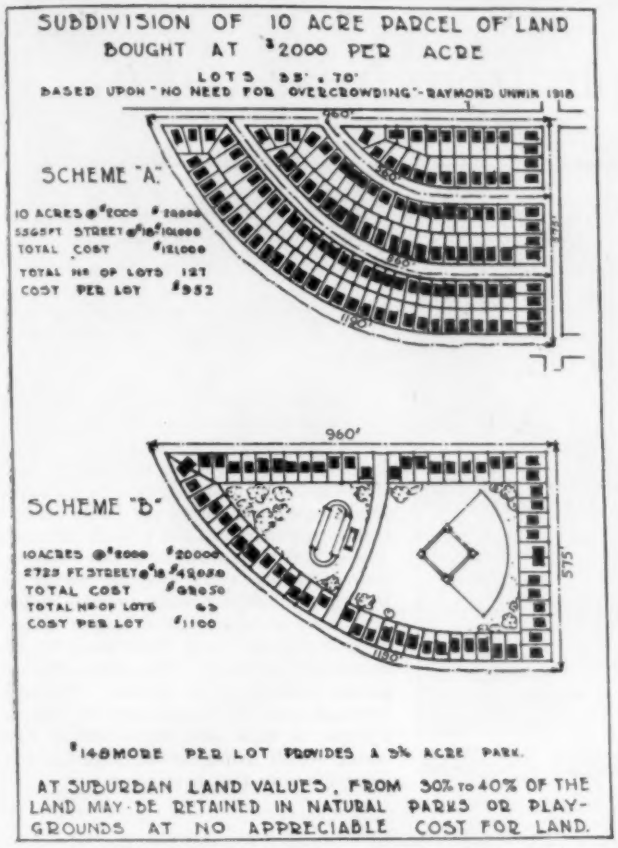

SUBDIVISION OF 10 ACRE PARCEL OF LAND
BOUGHT AT $2000 PER ACRE
LOTS 35' x 70'
BASED UPON "NO NEED FOR OVERCROWDING"- RAYMOND UNWIN 1918
SCHEME "A"
10 ACRES @ $2000 $ 20000
5565 FT STREET @ $18 $ 101000
TOTAL COST $ 121000
TOTAL NO OF LOTS 127
COST PER LOT $ 952
960'
SCHEME "B"
10 ACRES @ $2000 $ 20000
2725 FT STREET @ $18 $ 49050
TOTAL COST $ 69050
TOTAL NO OF LOTS 63
COST PER LOT $ 1100
960'
575'
$148 MORE PER LOT PROVIDES A 5¾ ACRE PARK.
AT SUBURBAN LAND VALUES, FROM 30% to 40% OF THE LAND MAY BE RETAINED IN NATURAL PARKS OR PLAYGROUNDS AT NO APPRECIABLE COST FOR LAND.

FIG. 2. HENRY WRIGHT'S CHART, ADAPTED FROM RAYMOND UNWIN'S MONOGRAPH

Schemes "A" and "B" have the same boundary streets, the length of which totals 2,725 feet. In Scheme "A" there are in addition 1,420 linear feet of interior street. This must be multiplied by 2, as the costs in each case are figured on the basis of one-half of the street width. Scheme "A" therefore has a total length of 5,565 linear feet of half street. The path through the center of Scheme "B" is not a highway, and has not been counted. A slight charge should have been made for it, but that would be a part of park costs

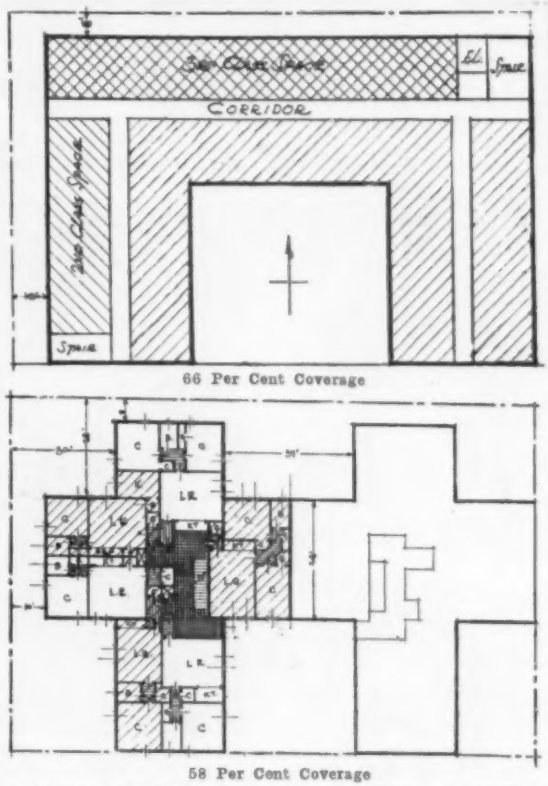


FIG. 3 TWO DIFFERENT USES OF AN APARTMENT HOUSE SITE

In "The Architectural Record" (New York) for August, 1929, Henry Wright presents the accompanying sketches, showing (Plan A) a 6-story, 210-room, elevator apartment house covering 66 per cent of a lot 150 x 100 feet, and (Plan B) a design for a 4-story, 140-room- non-elevator building on the same site, covering 58 per cent of the lot. Assuming a land cost of $40,000, and the same rental ($25 per room) for both buildings, and adding only $1,890 to the annual carrying charges to cover an estimate of 3 per cent more vacancies on account of lack of proper light and air in the larger building, Mr. Wright's figures show a surplus annual profit of $3,136 on Plan A, and of $4,113 on the more spacious Plan B.*

Real Estate Journal gives prominence, as the leading article in its issue of September 2, 1929, to an address delivered by Mr. Wright before the Home-builders and Subdividers Division of the National Association of Real Estate Boards, on "How to Reduce the Cost of Land Development." A note by the editor of this leading national organ of the realtors urges a careful study of Mr. Wright's paper, and emphasizes the fact that he shows how, "by a rearrangement of our outworn gridiron system, ample provision can be made for parks or playgrounds at practically no increased cost for buyers."

A comparatively low coverage is practicable, even in sections of the city of New York. Alexander M. Bing, President of the City Housing Corporation, and one of New York's most successful and public-spirited developers, has urged that in outlying parts of the city, apartment and tenement houses be not allowed to occupy more than 40 per cent of their respective plots. Mr. Bing's computations show that land can still be had in Queens, the northern Bronx, outlying Brooklyn and most of Staten Island at prices low enough to make such a restriction of great benefit to tenants. Discussing this subject before the Legislative Committee on Revision of the Tenement House Law, of New York, about two years ago, Mr. Bing said:

"The present law, by permitting builders to cover 70 per cent of the land and to build six stories high, has a tendency to permit the land values to increase rapidly in many outlying sections. These increased land values are a social detriment, not a benefit. They mean higher interest charges and taxes and compel a more intensive use of the land. Not until we adopt more stringent limitations as to the land to be covered, coupled with a definite policy to create industrial centers in outlying sections of the city, can we hope for a lessening of the evils of overcrowding the land and overcrowding transit facilities."

The automobile dealer catering to a family able to live in an apartment renting at $25 per room per month doesn't urge the whole family to crowd into his most congested type of car. He appeals to their desire for spaciousness and sells them a large car—or two cars. Our apartment house builders who cater to the upper economic groups are now responsible for some of the worst examples of excessive lot coverage. May we not hope that they and the money lenders and the realtors will learn the lessons which the automobile industry has to teach them as to spaciousness in design and imagination in sales appeal?

To be concluded in the December number.

* EDITORIAL NOTE.—THE AMERICAN CITY would go a step farther than Mr. Wright, and assume a coverage of only 40 per cent of the lot area. Using the Plan B building, the added land, at the same cost per square foot ($2.67) would increase the investment by $18,000. Figuring 9 per cent per annum for interest, taxes, etc., on this additional land, this would add $1,620 to the carrying charges. But the tenants would have 6,750 square feet more of open space for wider courts and yards, for better setback from the street, and for grass, trees and recreation or parking space. If they would pay $25 per room per month for space in the Plan B building with 58 per cent coverage, would they not gladly add $1 per room per month, which would more than compensate the owner for the much greater attractiveness of the 40 per cent coverage?

Pictures and Paragraphs from Near and Far

NO FLOWERS GIVE MORE STRIKING RESULTS IN HOME GARDENS AND PUBLIC PARKS, FOR THE SAME AMOUNT OF EFFORT, THAN DO THE DIFFERENT VARIETIES OF TULIPS

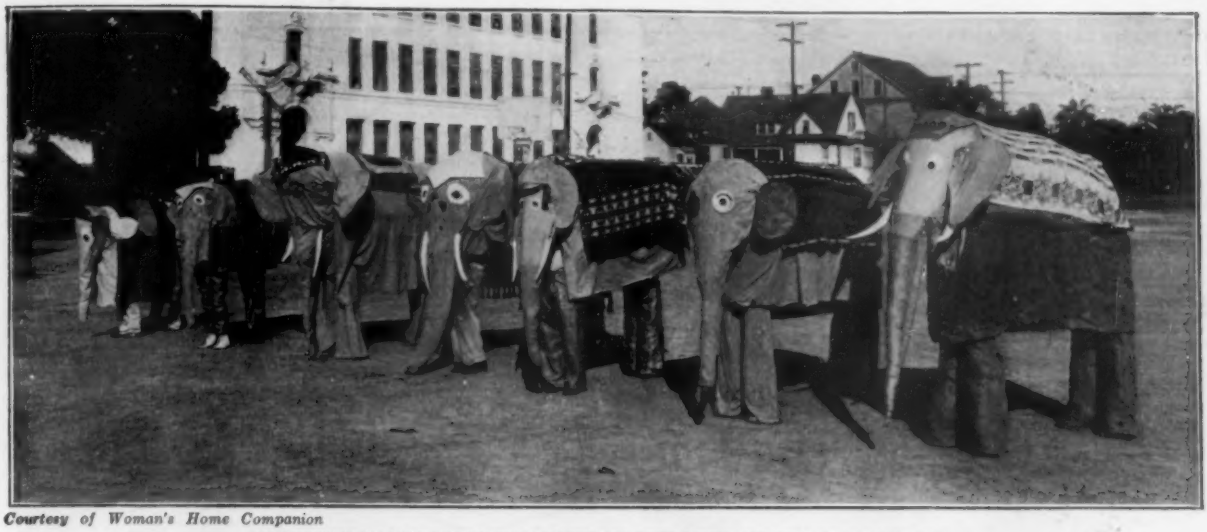
Planting a Million Tulip Bulbs to Bloom Next Spring

SO successfully was the Tulip Week in Holland, Michigan, last May, that this fall, instead of a quarter of a million bulbs, an entire million high-grade tulips are being planted in that city both by private citizens and by the municipality. The experiment was first carried out in the spring of 1929, when a quarter-million tulips bloomed throughout the city. People have become so enthusiastic over the project that plans are now being made for launching a permanent 'Tulip Week." Officials in charge of the project are convinced that within the next two or three years virtually every property owner in the city will devote some portion of his front lawn or curb to the raising of tulips, thereby making Tulip Week an event of nation-wide attention. The accompanying picture shows how the streets in Holland will look next May—or rather, it gives a glimpse of what was accomplished last spring which helps one to visualize the greater beauty that is to come.

P & A Photos

THESE GARMENT WORKERS HAVE A CITY BLOCK FOR NOON-HOUR RECREATION

Fresh air is scarce in some of the garment shops that line 36th Street, between Seventh and Eighth Avenues, New York, so this block is welcomed by thousands of workers as their own during the noon hour. Commissioner Whalen ordered the block closed to traffic for the hour each day, and the picture shows that the innovation met with a popular response



Courtesy of Woman's Home Companion

INTELLIGENT PERFORMERS IN THE PLAYGROUND CIRCUS, LOS ANGELES

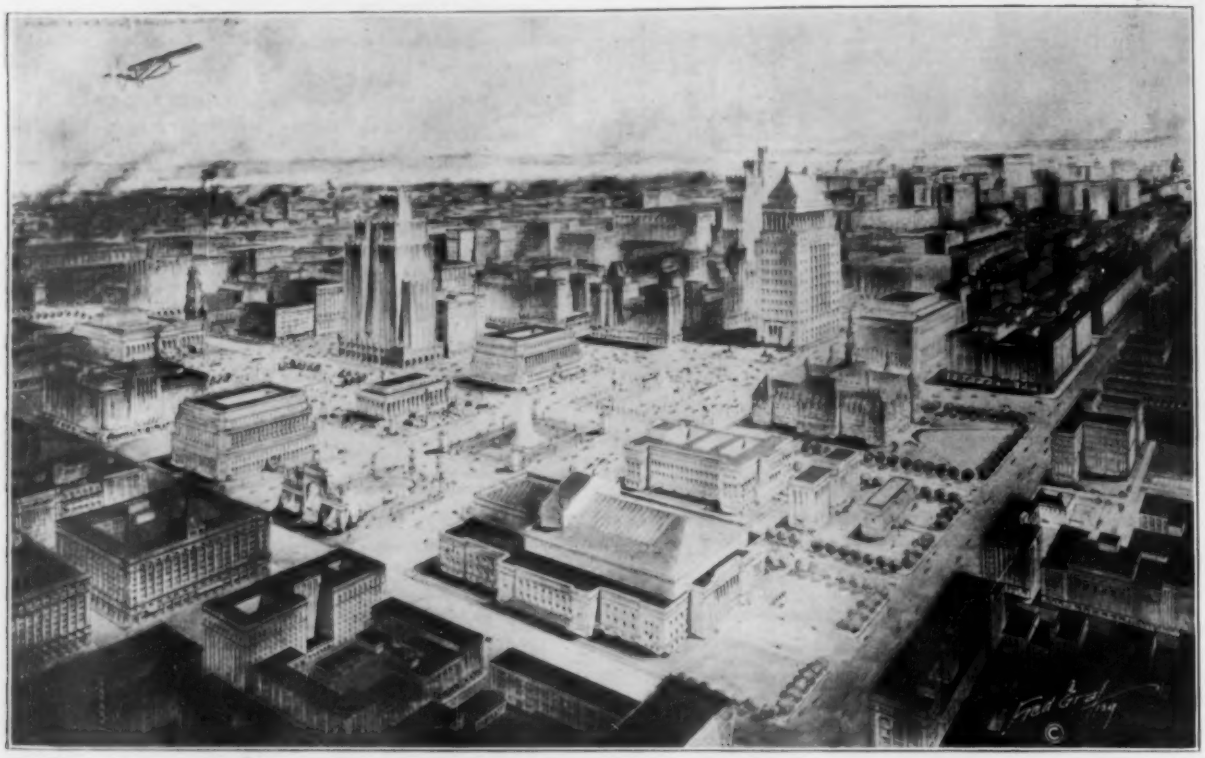
Burlap and paint, couch covers and fancy tablecloths, produced these remarkable make-believe elephants

P & A Photos

ONE OF THE THINGS THAT MAY HAPPEN ON A WINDY DAY

The picture at the right expresses only a part of the consternation that attended the falling of a heavy sign upon a New York City sidewalk. The force of the fall and the hazardous condition of the sign itself are indicated by the shattered boards

In any city, on any windy day, the falling sign is a great menace, and not infrequently causes fatal accidents. It is easy to imagine the tragedy that might have occurred if pedestrians had been struck by this sign in its downward s w o o p. The magazine "Safety," the organ of the American Museum of Safety, by whose courtesy this picture is used, emphasizes the importance of inspecting all signs periodically, especially in preparation for the winter season, when the weather does not so easily permit the work of assuring property owners that sign fastenings are strong and tight



The Memorial Plaza in St. Louis Will Look Like This When Completed

THE ultimate development of this magnificent civic center in St. Louis calls for eight public buildings about the main wall—the City Hall, the Municipal Courts Building, the Municipal Auditorium Convention Hall, a State Building, a Memorial Building, a Federal Office Building, the Public Library, and a Civil Courts Building. The Plaza will undoubtedly be completed within the next two or three years when additional funds are available for landscaping this area.

The location of the civic center has been determined in accordance with the various projects contemplated to make St. Louis a more convenient place in which to carry on business and live. The plan was prepared under the direction of Harland Bartholomew, Engineer of the City Plan Commission, assisted by Henry Wright, Architect.

The land included in the civic center approximated 27 acres. While the passage of the necessary condemnation legislation to secure this land was being pushed, the owners and the city officials agreed on prices, which resulted in the city's acquiring through direct purchase almost 87 per cent of the total area. The bond issue of 1923 provided $15,000,000 for ground acquisition and the erection of several of the buildings.

The tower-like structure at the right of the Plaza at the back is the Civil Courts Building, and below it, nearer the front, the City Hall. Next toward the front is the Municipal Court Building, and in the center foreground, the Auditorium.

THE BUSINESS DIRECTORY IN NAPA, CALIF., IS APPRECIATED BY TOURISTS AND STRANGERS

The Business Directory mounted on the wall of one of the buildings in Napa, renders valuable service in directing strangers and others to the various concerns represented. It consists of a series of seven glass-covered panels in which the names and advertisements of the various firms are placed.

A stranger may at a glance quickly ascertain the names of companies or individuals engaged in the different businesses and then telephone or visit the establishment selected from the information given

HOW GRAND RAPIDS HELPS THE TOURIST
See department of Forward Steps, page 149

Intelligent service to travelers, as illustrated in the picture at the left, finds no parallel in the picture on the right. The motorist who looks for guidance to this roadside sign in a Southern city, goes on unwarned and uninformed

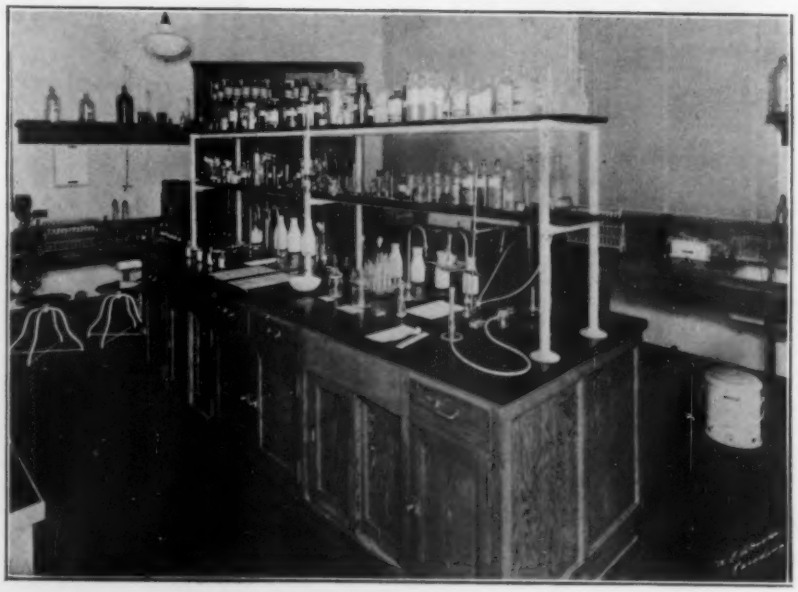
TEACHING HEALTH AND SAFETY IN THE SCHOOLS

The pupil who makes a poster to express a lesson which a teacher outside the art department is trying to emphasize, is not likely to forget the deepest meaning of his work. The poster at the left won a prize of $25 in a contest. It shows the equal importance of right foods and recreation in building health, and is the work of Lawrence J. Gayda, of the South High School, in Pittsburgh, Pa.

The smaller poster, showing the upright and commanding keys to grade-crossing safety, was made by an elementary school pupil

THE LABORATORY OF THE HEALTH DEPARTMENT IN PASADENA, CALIF.

The Health Department of Pasadena is housed on the third floor of the south wing of the City Hall, in the Civic Center, and is considered an excellent example of adequate provision for health department work. (See diagram on page 143, The American City, September, 1929.) Good laboratory work requires good quarters and good equipment. If the laboratory is so situated that its contact with the general work of the department is made difficult, this is likely to be handicapping to the laboratory itself and to the other units of the department



Beauty Added to Utility in Elevated Water-Tank

By PAUL HANSEN
PEARSE, GREELEY & HANSEN, CHICAGO, ILL.

THE water-works at Highland Park, Ill., serve the communities of Highland Park, Deerfield and Highland Park is an exceptionally at- of about 20,000. The necessity for filtration of the supply became apparent three or four years ago. This led to a careful study of the situation, which resulted in the decision to rebuild the entire works, including a new pumping-station and filter plant with a nominal capacity of 7,000,000 gallons per 24 hours, reinforcing mains and a new elevated tank of 500,000 gallons capacity and 125 feet in height. The logical location for the elevated tank is near the center of Highland Park. Inasmuch as Highwood, in all a present populatio. tractive suburban community of the city of Chicago, it became important that the tank should not be unsightly. Accordingly, it was decided to enclose the tank with an ornamental structure, as shown in one of the illustrations. The cost of the tank was $34,200, and the cost of the enclosing structure $54,440.

THE STEEL TANK AT HIGHLAND PARK BEFORE THE MASONRY ENCLOSING THE STRUCTURE WAS STARTED

THE TANK AS IT WILL APPEAR WHEN THE OUTER CASING IS COMPLETED

The new works were designed by Pearse, Greeley & Hansen, engineers, and are being built under their direction. The enclosing structure was designed by A. S. Coffin, architect. The contractor for the elevated tank is the Chicago Bridge and Iron Co., and the contractor for the enclosing structure is Jerome A. Moss. George B. Prindle is resident engineer.

Ugliness and Civilization

NOTHING can be valid that has sordid and self-satisfied ugliness to any great degree. We were meant to live in beauty, to cherish it and create it, and a civilization that functions in the hideous and uncouth is a civilization of the wrong shape, whatever the testimony of the bank and the clearing-house, and imposing statistics as to the balance of trade.

JOHN NOLEN.

Equipment and Personnel of Municipal Fire Departments in Relation to Population

GENERAL rules covering the amount of apparatus required, as determined by population, are contained in the National Board of Fire Underwriters' Standard Schedule for Grading Cities and Towns with Reference to their Fire Defenses and Physical Condition. These rules read in part as follows:

8. *Apparatus Required for Engine and Hose Companies.*—The amount of apparatus in service and regularly responding to alarms should be sufficient to properly protect the city and shall be on the basis of companies required, it being assumed that each engine or hose company will be provided with a hose-carrying vehicle, and that in cities of over 100,000 population one-half the engine companies that should attend any first alarm in high-value districts will be provided with a steam or automobile fire-engine and a separate hose-wagon; other engine companies may have only a combined pump and hose-wagon.

Apparatus may be hand-, horse- or motor-drawn. Where 80 per cent of the apparatus is motorized, the formula for automobile companies may be used.

(P = population in thousands.)

For cities under 50,000,

Number of engine and/or hose companies,

$1.0 + 0.14$ P. for horse-drawn

$0.85 + 0.12$ P. for automobile

For cities having population of 50,000 to 200,000,

Number of engine and/or hose companies,

$4 + 0.08$ P. for horse-drawn

$3.4 + 0.07$ P. for automobile

For cities having population in excess of 200,000, the number of engine or hose companies depends on distribution, as covered by item 10, and on the ability to handle two simultaneous large fires without leaving all other sections of the city unprotected.

NOTE.—In certain cities a number in excess of the above will be required, depending on the structural conditions found in the city. Where the topography and general layout of the city require, for proper distribution, a greater number of companies than determined by the formula, deficiency will be applied under item 10.

In cities almost solely residential in character, such as suburbs in metropolitan districts, or where the city has small local high-value centers needing less protection than the formula for companies calls for, the estimate will be based on the population corresponding to the fire flow believed necessary, as used in item 6, Water-Supply, except that where such cities have congested shingle-roof frame districts, at least two additional companies must be provided to protect the city in case of a second fire.

9. *Ladder Companies.*—In cities having five buildings three stories or higher, there shall be one ladder company; in cities of over 20,000 population, the number of ladder companies shall equal $1 + 0.03$ P.; for cities of over 200,000 population, the number of companies will depend upon distribution as covered by item 10. Where no ladder company is required, ladder equipment on other apparatus should be adequate to reach the roof of two-story buildings; this requires a 24-foot and a roof ladder. An aerial ladder must be provided in a district where five buildings are four stories or higher, and one ladder truck in five shall be aerial.

A reserve ladder truck shall be provided for each five or fraction thereof required; where the number of ladder trucks in service exceeds the number required or ladder trucks are in service in territory where short ladders carried on hose wagons are sufficient, these may be considered as reserve.

10. *Distribution of Companies.*—In general, distribution shall be such as to provide an engine or hose company and a ladder company within the distances of every point in a district, measured by the most direct route, as shown in the table below.

These requirements will vary, depending on the topography and character of the city. Hand-drawn apparatus is considered on same basis as horse-drawn, the lack of horses being governed by item 26.

District	HORSE-DRAWN		AUTOMOBILE	
	Engine or Hose Co.	Ladder Co.	Engine or Hose Co.	Ladder Co.
Mercantile or manufacturing	½ mile	¾ mile	¾ mile	1 mile
Closely built residential	1 mile	1½ miles	1¾ miles	2 miles
Scattered residential	1½ miles	1½ miles	3 miles	3 miles

11 and 12. *Maintenance of Companies.*—Strength of companies shall be maintained as follows:

Companies	Least Number of Men on Duty Day Time	Night Time
Within or near any high-value district:		
Engine company	7	9
Ladder company	7	9
Hose company	5	7
Water-tower company	1	1
In other districts:		
Engine company	5	7
Ladder company	5	7
Hose company	3	5

In places of less than 50,000 population, consider as high-value hose or engine companies the number necessary for first alarm as required in item 30, regardless of the location of the others. Where an aerial truck is not required (see item 9), consider ladder companies on five-man basis, regardless of location.

A hose or ladder company equipped with one piece of apparatus serving both purposes, and credited under both items 8 and 9, or as both a hose company and a ladder company under item 10, requires a minimum strength of three men more than a hose company if in a residential section, or five men more than a hose company if in a high-value district.

NOTE A.—The above strength of engine companies is based upon the use of steam fire-engines; one man less may be allowed in companies having automobile pumping-engines.

NOTE B.—If drivers do not perform fire duty, the above strength of companies affected must be increased by one.

NOTE C.—Where high-pressure fire systems are in use and a man is detailed to remain at the hydrant, strength of hose companies in the district served must be increased by one.

NOTE D.—The minimum above may be decreased by one man, in ladder companies having quick-raising aerial trucks.

A Discussion of the Foregoing Rules

By GEORGE W. BOOTH

CHIEF ENGINEER, NATIONAL BOARD OF FIRE UNDERWRITERS

IN a paper delivered at the meeting of the National Fire Waste Council, held in Washington, D. C., on October 1, Mr. Booth pointed out that it will be readily understood that no hard-and-fast rule can be devised for determining the amount and kind of fire department equipment and the number of men required to operate it effectively, in so far as these factors may be dependent upon population. The character of construction, the degree of congestion of buildings, the extent and nature of manufacturing and mercantile development, the water-supply available, and possibly other features, are all factors in the situation. Some cities are almost entirely residential in character; others, which serve as the mercantile center for an extensive surrounding district, present a fire protection problem much more difficult than that of the usual city of the same population.

Discussing these rules, the speaker continued:

The total capacity of pumping equipment for cities of less than 200,000 population is interrelated with the fire flow required to be available from the water-

supply system, the ratio of the total pumping capacity to the fire flow required being approximately as two to three. In cities of over 200,000 population, the number of companies needed is determined rather by distribution as governed by the area, topography, and character of the city.

Three Hundred Cities of Different Sizes Studied

Prior to the preparation of the Grading Schedule, the Committee on Fire Prevention of the National Board had made inspections and prepared reports on approximately 300 cities of varying sizes; the table of required fire flow, as well as the standards for number of companies, was fixed upon after a study of conditions in these 300 cities, and the general practice in those cities where fire protection had been developed to a high degree of excellence. In other words, these standards are not technical nor theoretical, but constitute a reflection of what has come to be accepted by municipalities as good practice. It is remarkable to note the close agreement between the table of required fire flow and the amount of water actually used during large fires and conflagrations such as those in Baltimore, Augusta and Atlanta, Ga., and Fall River, Mass., where the records of the water department enabled a close estimate to be made of the excess rate of water consumption during these conflagrations.

It is obvious that one company is the least number that must be provided, regardless of the size of the municipality; up to a population of about 10,000 the number of companies required is greater in proportion to population than for the larger municipalities. Beyond that size the number of companies and the amount of water required increase almost directly in proportion to the population until that figure reaches 200,000.

Application of the schedule to many cities shows that the largest charges in the fire department are generally inadequate manning. The underlying principle which governs the standards in this respect is that each fire company, whether classed as engine, hose or ladder, shall be provided with sufficient man-power to handle effectively the equipment assigned to it. Charges are based on the minimum number on duty, and are applied for both day and night conditions. Engine companies are required to have at least six men present when stationed in high-value districts, and four when located in other sections. At night these numbers are increased by two partly because night fires are apt to gain considerable headway before being discovered, and partly because of the added difficulty of fighting fire in the dark. Ladder companies in high-value districts are required to have seven men during the day and nine at night, except that if they are equipped with quick-raising aerial trucks, one less is sufficient. Day and night strength may each be decreased by two men in districts not classed as high value.

The idea that the night strength of companies should be greater than the day strength was fixed upon only after securing the opinion of a considerable number of fire chiefs in the larger cities to the effect that the reasons for this greater night strength were sound. It is difficult now that most fire departments are organized on the two-platoon system, to arrange for providing a greater strength on one platoon than on the other. In some cities the strength of both platoons is equivalent to that given in the Schedule for the night platoon strength; the extra men of the day platoon are used for making building inspections, for theater details and other assignments not strictly in line with fire-fighting duties.

A few years ago one of the largest charges was apt to be based on the lack of fire-engine capacity, but recently the development of fire departments has been so rapid that many cities have eliminated this charge completely. It is assumed that of the total amount of water required for fire protection, one-third will be wasted in various ways and two-thirds will be used by the fire department. Such records as are available indicate that this estimate of the amount of water wasted in various ways is quite close to the actual figures.

A fire department may be strong in man-power and well equipped with apparatus and still not be effective in extinguishing fires. A number of causes may contribute to such a condition. Discipline may be lax; drills and training may be of little value, and the response to alarms may be poorly arranged. Fire methods may not be modern. Unpaved streets, railway crossings at grade, open drawbridges, automobile parking and traffic congestion may retard the response of fire apparatus. Overhead wires, possibly of high potential, may hamper the department. Officers may make no inspections, and therefore may not be familiar with the construction and occupancy of the building which is on fire.

Constantly Adequate Man-Power Essential

By reason of the increasing cost of operation, many municipalities have found it necessary to economize by decreasing the number of companies or the man-power assigned to them. When this becomes necessary, it is far better, in our opinion, to operate a less number of companies, each of them reasonably well manned, than to distribute an equal number of men among so many companies that no one of them is sufficiently well manned to be able to operate effectively. Then by providing a good amount of reserve equipment and making definite arrangements to man it by the off-shift, for serious fires, generally satisfactory service can be obtained. It must be noted, however, that little dependence can be placed on the offshift in the larger cities. Experience in New York City was such that Chief Kenlon in his annual report for the year 1919, commenting on response of off-shift men at the Greenpoint oil fire, said:

"I have publicly stated on more than one occasion that it would be impossible to round up the off-platoon and get them to the scene of a fire in time to be of any material assistance. That I am right in this contention was clearly demonstrated at the Greenpoint fire in the fall of 1919. A dangerous fire broke out in the plant of the Standard Oil Company in Greenpoint. Five alarms and also a borough-call had been transmitted before the day platoon went off duty. Surely this must be regarded as ample notice that a dangerous fire was raging in the city. Notwithstanding this notice, which every fireman received by telegraph, the platoon going off duty at 6 o'clock, when summoned to return for duty at 10:15, by a recall signal, did not respond in force. A few men reported after one hour, some more within two hours, and so on, strung out over a period of eight hours, when 112 men and officers, out of a total of 1,575 on the off-platoon, had reported.

"This to my mind, is conclusive evidence that the platoon on duty must be strong enough to protect the lives and property of this city. No reliance can be placed upon men who may be twenty, twenty-five or even thirty miles away. The dangerous time at all fires seems to be the first thirty minutes. A fire not under control in one hour is regarded by fire officers as a dangerous fire and may develop into conflagration proportions; consequently, in large cities, at least, where it is difficult to reach men on an off-shift, the shift on duty must be strong enough to cope with all emergencies."

Engine or ladder companies going out with only two or three men are obliged to depend upon assistance from men of other companies or from citizens to make effective use of the apparatus and equipment with which they are provided. Some cities do, and all of them ought to, have definite provisions for calling the men on the off-shift in the event a conflagration or even a large fire occurs.

The Recommended Pumping-Engine Capacity

It has been the general practice of the National Board to recommend that pumping-engines for fire department use have a capacity of at least 750 gallons per minute. This in most cases requires a specially built machine, although it is possible to obtain commercial truck and bus chassis which have engines of sufficient capacity to deliver this quantity of water.

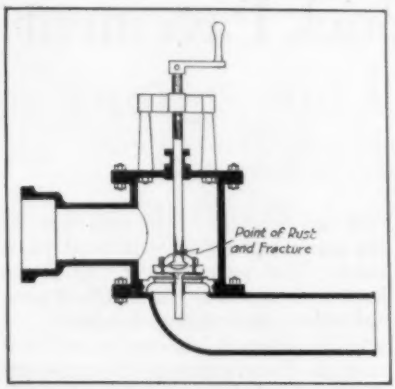
Machines built for fire service, of this capacity and greater, are expensive, and numerous attempts have been made to provide cheaper machines by placing a pump on a light commercial chassis; this usually results in machines of 500 gallons and less capacity.

Although these smaller machines render reasonably good fire service, it is questionable whether they are economical in the long run. A piece of fire apparatus should be good for at least twenty-five years' service, on the basis of its hours of use as compared with that given a commercial truck of similar make. It is therefore wise to consider the purchase of fire apparatus as an investment which will give satisfaction for many years to come.

Water-Main Cleaning Unearths an Antique

St. Louis Saves the Cost and Inconvenience of New Mains in the Business District and Discovers 90-Year Old Valve

A CONTRACT for cleaning 10,064 feet of 12-inch and smaller mains in the downtown district of St. Louis in the last twelve months has saved the cost of new mains and the consequent upset conditions that would have existed in the district during their installation. The National Board of Fire Underwriters had made a study of



PLAN OF OLD STOP VALVE REMOVED FROM 2D AND CHERRY STREETS, ST. LOUIS, JUNE, 1873; PUT IN, 1839

the distribution system and found that the fire flows were not up to the Board's requirements in certain places. Investigation by the city showed that some of the pipe was equal to about 23.5 per cent of new pipe as regards carrying capacity.

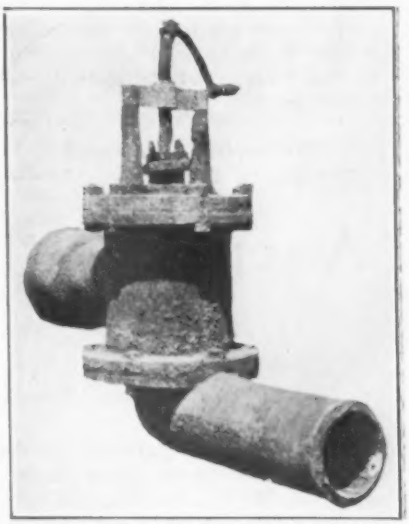
Night Cleaning Necessary

As the downtown district is exceedingly active during the day, it was necessary to do all cleaning at night. Excavations for the openings into the pipe for the insertion of the cleaning machine were made during the day, work starting as early as 8 or 9 in the morning. The pipes were gouged to weaken them, but not sufficiently to cause a break.

Notices were sent to all consumers early in the day, and sometimes on previous days, warning them that the water was to be shut off between certain hours. Serious consideration had to be given to hotels where guests would be using water at all hours. Most of the hotels have connections from two different streets, thus providing against being without water when a main breaks. For buildings needing water during the shut-off period and not having the necessary two connections, the Department laid a fire hose from the nearest hydrant to the building and tapped into the water line in the basement.

Method of Cleaning

The section of main to be cleaned was valved off from the remainder of the system and a piece of pipe varying from 3 to 5 feet in length cut out at each end of the main. At the end from which the cleaning was to start, a piece of pipe of similar length with a cone-shaped float attached to a ⅛-inch cable was placed in the main. This cable was fed into the main through a special sleeve, which was fastened in place where the pipe was cut out. When the water was turned on, the float moved through the main and pulled the cable after it.



A PHOTOGRAPH OF THE OLD BELL-AND-SPIGOT VALVE REMOVED FROM THE ST. LOUIS SYSTEM RECENTLY

At the far end where the main was cut, a 45-degree curve was inserted and a piece of pipe placed extending to the surface. After the cable had been shot through, the sleeve was removed and a larger cable pulled through with the smaller one. The cleaning machine was attached to the large cable, the pipe sleeved up and the water turned on. Then the machine was pulled through.

In 1928, Thomas J. Skinker, Engineer in Charge of Distribution, Water Department, St. Louis, Mo., in a paper read before the Indiana Section of the American Water Works Association,

A PICTORIAL HISTORY OF VALVES IN THE ST. LOUIS WATER-WORKS

From left to right, the valves were installed in 1839, 1889, and the last two in 1929, showing the reversion to bell-and-spigot type valves from 1839 to 1929

stated that the total cost for water-main cleaning on 6-inch pipe was 32-2/3 cents per foot. This figure includes excavation and doing all the work of cleaning the pipe, permanently repairing the street and hauling away the dirt or flushing the street. The contractor was paid 10 cents per foot for the cleaning, and the Water Division labor amounted to 19-2/3 cents and the material cost 3 cents per foot.

90-Year-Old Valve Found

Recently, on Walnut Street between Broadway and the Mississippi River, when a line was being floated through preparatory to cleaning the 6-inch main, an obstruction was encountered. Upon measuring the distance to the obstruction, it was a matter of only a few minutes before it was possible to excavate and determine the cause of the stoppage, which proved to be an antique valve. The records of the Division showed that in 1873 a valve of identical design was unearthed and a drawing was made of it. This drawing is reproduced herewith through the courtesy of Mr. Skinker. The caption on the original drawing states that the valve was installed in 1830, thus making the valve just uncovered 90 years old.

It is interesting to note that the old valve had bell-and-spigot connections, a type that St. Louis has returned to after having given it up for the bell connections for many years. One of the illustrations shows the old valve of 1839 with its bell-and-spigot connection, a valve of 1889 with its two bells, and two valves of the type used now, one with bell and spigot, the other with two bells.

Accepted Methods of Vitrified Brick Pavement Construction

By GEORGE F. SCHLESINGER

CHIEF ENGINEER, NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION

THE first brick pavement in the United States was laid in Charleston, W. Va., in 1871, and gave satisfactory service for 38 years. When the early brick pavements were constructed, the individual units used in the pavements were inferior, as judged by present-day standards. The present-day brick pavement is designed with a much thinner cushion course than was used formerly. This is possible because modern specifications require the base course to be finished practically as smooth as the surface of a road. The cushion should not be thicker than 1 inch, and preferably ¾-inch. In the southern section of the country, vitrified brick surface courses are successfully laid on such foundations as natural sand, Florida lime-rock, crushed stone, chert, and gravel. Brick surface courses also are giving excellent service on macadam, black base and concrete.

Depth of Brick Course

Experiments conducted by the U. S. Bureau of Public Roads on the circular test track at Arlington demonstrated that brick of the standard sizes recognized by the committee of the U. S. Department of Commerce, when properly supported, will withstand the heaviest traffic on streets and roads. The use of brick of these sizes has been greatly increased since the results of these tests were made public, in 1926. The depth of the vitrified brick surface course most common and popular among engineers is 3 inches, although 2½ inches is used considerably for medium traffic pavements. The Arlington test also seemed to indicate that sand cushions are preferable to a cement-sand mixture. In sections of the country where granulated blast furnace slag is available, this material is favored by some engineers for the cushion course.

Filler

The filler now advocated is a bituminous or flexible material. Practically all of the material now being used in modern brick pavements is asphalt. In a few instances tar pitch mastic is still used, and the tar interests are now working on the development of a tar filler containing an admixture that would make it more suitable for use in brick pavements. Some experimental work is being carried on to determine the consistency of asphalt to use as filler. A test of this kind is now under way on a brick project in Ohio by the Ohio State Highway Department. The city of New Orleans has had good results with asphaltic mastic for filler.

Portland cement grout, which was formerly used as filler on high-type brick construction, is still used to some extent for special work such as street-car tracks, gutters and parking places. In such cases, however, provision should be made for expansion.

Sand filler is used to some extent, especially in the South where it is planned to strengthen the base course and relay the brick at some future time. In other words, this is a stage construction procedure.

In addition to the joints being sealed against the entrance of moisture, the difficulties incident to temperature change, such as occasional blow-ups, have been obviated by the use of the soft filler.

Type of Brick

The plain wire-cut brick is now being used in some sections instead of a brick with lugs for separating the courses. Such brick have been used for many years in the West, where they are known as "vertical fiber." Engineers in the East are more favorable to the lug type. Although it takes careful workmanship to fill lugless brick properly, the results that can be obtained are evidenced by the many successfully completed pavements. The asphalt filler should be heated to not less than 375 degrees Fahrenheit and applied as directly as possible before it has time to cool and congeal. Some engineers favor the use of the so-called cart-squeegee for this purpose. Another recent practice is to discharge the asphalt through a hose connected with a heated distributor tank directly on the pavement, where it is immediately squeegeed into the joints.

Because a lug brick is more fool-proof so far as the filling is concerned, there are many projects on which this type is specified. The wire-cut lug brick is meeting with more favor than the brick on which the lugs are produced by repressing the brick.

Relaying the Resurfacing

Another recent development is the practice of taking up old bricks in pavements 30 years or more old and relaying them in new improvements. In some cases, it has been possible to entirely avoid the purchase of new brick. Many relaying projects of this kind have been constructed that have the appearance of new pavements and are striking illustrations of the long life and salvage value of vitrified brick as a paving material.

Vitrified brick has also found favor as a resurfacing course for all pavements that have begun to fail and break up under traffic. Many of these were built 14 and 16 feet in width, and by widening with a curb on each side and covering the existing pavement with an asphalt-filled brick surface course on a suitable cushion, the old paving can be salvaged and the result is a very fine appearing and substantial street or road. The cracks in the old pavement will not appear in the brick surface, because of

its being composed of small units separated by bituminous joints, each of which acts as an elastic medium. At the same time, the pavement has to a considerable degree the attributes of a rigid surface and will not wrinkle, shove or rut under traffic.

The use of a bituminous sand mixture for the cushion course has been suggested, and at least one project in which such a cushion is being used is under construction in the city of Pittsburgh. In this case tar was the bituminous material.

Unparalleled Cost Records

The 16-year-old Chevy Chase Connecticut Avenue road test of 17 types of pavements, conducted by the U. S. Bureau of Public Roads, has shown the economic advantage of the two-course type of pavement design. Dr. A. F. Woods, Director of Scientific Research of the U. S. Department of Agriculture, said recently, "It is believed that no other road anywhere in the world exists for which there is such a parallel record of cost and traffic covering so long a time." The maintenance expense of the vitrified brick laid on a 1:3:7 concrete base 6 inches in depth was the lowest of any of the pavements, and today, quoting from a recent report of the government engineers, "the surface has the same smooth, unworn appearance as originally."

The modern vitrified brick pavement composed of tough, dense units, resistant to the destructive agencies of climate and traffic, the interstices between the vitrified brick filled with an elastic and adhesive bituminous seal, laid on a thin cushion course, which in turn rests on a foundation suited to local climatic subsoil and load conditions, satisfies the requirements of an economical, pleasing and high-quality two-course pavement. It has survived the changing traffic conditions of the last half-century, and will continue to play a prominent part in highway transportation development.

Bumps and Holes Eliminated on the Main Traffic Street of Glens Falls

A Speedy Method Employed That Permitted the Use of the Street Immediately After Rolling the Asphaltic Material

GLENS FALLS, N. Y., has been faced with the problem that so many cities dodge, namely, the resurfacing of the main street with some material that will take out the holes and make the street a respectable part of the highway system of the community instead of a curse to the traveling public. The condition of some city streets today is a sad commentary on the diligence of the officials responsible for their upkeep. It would seem that the pavements are left to become filled with holes to discourage speeding instead of employing a well-mounted motorcycle policeman to patrol the section. On some urban streets the policeman who patrolled them without a sidecar would be in constant danger of breaking his neck.

The main traffic street of Glens Falls contained an abandoned street-railway track which of itself was a constant menace to automobile traffic, particularly in wet weather. Both Glen Street and Hudson Avenue were selected for resurfacing with Amiesite during this past summer.

The mixing plant for the Amiesite was located at Little Falls, N. Y., about 150 miles away, but, as the material is shipped cold, the distance was not a detriment to the use of this material. The asphaltic concrete was delivered in gondola cars and unloaded by crane or by hand shoveling. It was hauled to the job by 3-ton trucks with metal bodies, the bodies being oiled before loading to prevent the material from sticking and thus making unloading a troublesome, time-consuming job.

Laying the Material Over Old Pavement

The base stone with the asphaltic coating was dumped on the brick pavement and spread by six men with forks and four men with rakes to a uniform layer, which was rolled at once by an Acme 7-ton roller. The loose layer was about 2¾ inches thick, which compressed to 1½ inches under the rolls. The rolls were kept oiled with a mixture of one-half kerosene and one-half water to prevent sticking. The base course is made up of stone varying from 1¼ inches down to ⅝-inch, according to New York State Specification for M. M. Type 4 paving.

No base course was placed along the gutters, because it was desired to keep the grade as nearly uniform as possible along the curbs. All manholes were raised and 2½ inches of the base course placed around the castings.

The top course was laid in the same manner, using material from ⅝-inch down, with the asphaltic binder mixed with it before shipment. A total of 2½ railway cars, each holding about 50 tons, were unloaded and spread each day. About 9 yards of finished pavement was laid per ton of material at a cost of $1.60 per square yard in place. This covered the filling of depressions in the base with the base course material and the completion of the two-course 2-inch Amiesite pavement.

Work of a similar nature was seen under way during the summer in Ticonderoga and Whitehall, N. Y., and many other projects were also noted in the province of Quebec.

Personnel in Charge of Work at Glens Falls

The work was carried on under the direction of George Hart, Commissioner of Public Works, Glens Falls, by E. L. H. Meyer, City Engineer. D. S. Morris, Field Engineer, from the Syracuse office of the Amiesite Corporation of America, was present to assist in carrying out the work.

LAYING AMIESITE PAVEMENT IN TWO COURSES ON BRICK PAVEMENT ON GLEN STREET, GLENS FALLS, N. Y.

AIRPLANE VIEW OF RADBURN, TAKEN SEPTEMBER 19, 1929

The street with separating middle strip and traffic island at the intersection (foreground left) has been constructed experimentally in accordance with the system of street crossings without intersection of traffic and without grade separation, described in the article by Fritz Malcher in the September and October issues of this magazine

Radburn's Unique Plan Shows Results

By HENRY M. PROPPER

RADBURN, the new "Town for the Motor Age" which is being built near Hackensack, Ridgewood, and Paterson, N. J., is rapidly taking on the appearance of a complete town.

The first residential section is all but completed and more than seventy families are already occupying their new homes. In addition to the individual houses, the Abbott Court Apartment Group has been opened for occupancy and the new Fair Lawn-Radburn station of the Erie Railroad is just being completed. The new town's own shopping center, consisting of a group of stores in the Radburn Plaza Building facing the station park, is open and doing a thriving business.

With the completion of the pedestrian underpass connecting the first two residential super-blocks, it is now plain to every Radburn visitor how the new safety street plan separating vehicular from pedestrian traffic works. This is the unique town planning feature which has given Radburn the name "Town for the Motor Age" and has attracted attention throughout the country.

The underpass connects the park and pedestrian walk system of one superblock with that of its neighbor, so that children and adults on foot can cross

12-FT. TURNING ROADWAY ACROSS 40-FT. MIDDLE STRIP OF PLAZA ROAD

PEDESTRIAN UNDERPASS AT RADBURN, CONNECTING FIRST TWO SUPER-BLOCKS, SO THAT SCHOOL CHILDREN NEED NOT CROSS A SINGLE TRAFFIC STREET

HOMES FACING A PARK IN RADBURN
A pleasant view plus abundant sunlight and air are assured permanently by the unique Radburn block plan which provides acres of park in every block

THE SHORT CLOSED-END STREETS AROUND WHICH THE HOUSES ARE GROUPED PROVIDE CONVENIENT ACCESS FOR THOSE COMING BY MOTOR
These streets are quiet and clean because they are not used by through traffic

FRIENDLY, INFORMAL FOOTPATHS ALL BUT OBVIATE THE NECESSITY FOR PEDESTRIAN AND MOTOR TRAFFIC COMING INTO CONFLICT
Children go all over town alone in safety

THE RADBURN PLAZA BUILDING, FACING THE RAILROAD STATION PLAZA, OFFERS A CONVENIENT SHOPPING CENTER
Stores are open and doing a thriving business

from one to the other in complete safety, not through traffic, but under it. Every house either faces or connects directly with the park, so that children can go there to play or to school without crossing a single street.

The parks and the safety street system have proved of great interest to homeseekers and have occasioned much favorable comment. The idea of keeping pedestrians and particularly children out of the way of automobiles has caught the popular imagination. Almost as important and popular is the entirely new plan of providing large parks immediately adjacent to the houses.

Most cities and towns are now making much more generous provision of park space than was the practice some years ago, but too often these parks are on the edge of town, in the outlying sections, and can be reached only after a more or less tedious ride by bus, trolley or subway.

At Radburn there are already about eight acres of park in the first two super-blocks. Many of the houses face right on the parks and the others connect directly with them. No house—not even the Abbott Court apartments—is more than 400 feet from the park.

These unusual features are bringing vast crowds to Radburn, many of whom marvel at the finished, "grown-up" picture which the new town presents. It is barely more than a year since the first spadeful of earth was turned and now there are concrete paved streets, attractive houses, many of them occupied, and all the improvements one expects to find only in a finished town, such as storm and sanitary sewers, municipal water system and the like.

EDITORIAL NOTE.—Former articles on the Radburn development have appeared in THE AMERICAN CITY as follows: "How Can a Section of the Town Get What It Is Prepared to Pay For?", June, 1929, page 98; "Application of Closed-End Street Plan at Radburn," April, 1929, page 142; "Economy, Charm and Safety of the Cul-de-Sac Street," November, 1928, page 104; "Construction Work Now Under Way for the Town of the Motor Age," October, 1928, page 81; "New Town Planned for the Motor Age," February, 1928, page 152.

Methods of Impounding Automobiles Vary in Different Cities

AUTOMOBILES that are stolen, abandoned, unusually dilapidated, or left standing for a long time in violation of the parking ordinance, are subject to impoundage in 55 of 63 representative cities in all sections of the country, according to data gathered by the New York State Bureau of Municipal Information.

In many of the 55 cities there exists no ordinance empowering the police or any other municipal department to impound such cars, but the policy prevails nevertheless. In 7 cities an ordinance providing for impoundage was at one time in effect and was repealed because it was held unconstitutional, or proved ineffective or aroused serious public opposition.

Certain of the cities impound only those cars which appear to have been definitely deserted or stolen, while others remove machines that are left on the street overnight, or for several hours, in violation of the parking ordinance. In practically every case, the automobiles are towed to a public garage and stored there until the owners claim them. In some instances the charge for storage is 50 or 75 cents per day, in others $1 or $2, with an extra charge for towing.

St. Louis offers an example of the small group of cities which apparently solve this problem without impounding cars. That city passed an ordinance in 1924 empowering the Police Department to confiscate vehicles parked in violation of parking regulations, etc., but its legality was questioned and the ordinance has not been enforced. At the present time, when owners violate the parking ordinance or park cars at night without lights, they are given a "ticket" by a police officer and must pay a set sum for such violation at the Traffic iolation Bureau or appear in court.

The same system is in vogue in Kansas City, where an impounding ordinance was repealed in 1925 because of dissatisfaction and criticism on the part of the public. A Traffic Violation Bureau operates in that city also.

Buffalo, N. Y., abandoned the impounding practice despite the fact that an ordinance is in effect there providing for it, because officers were held responsible for any damage to machines towed. Experience convinced the Buffalo Police Department that in nine cases out of ten, a person whose car was impounded claimed the loss of some article from it or insisted it was damaged when towed. Consequently, a summons for traffic violation is now served on owners of such cars rather than temporarily confiscating them.

Columbus, Ohio, had such an ordinance, but it was declared unconstitutional by a police judge, and the Council has not attempted to pass such legislation since then. Louisville, Ky., replied to the Bureau's query on its policy:

"The city had an impounding ordinance but it was abandoned because it interfered with other police work, was a perplexing problem and resulted in damaging cars towed in. Tagging without towing is operating 60 per cent more effectively."

Some cities maintain a city automobile pound and thus receive all fees paid by owners of cars that have been towed in. In practically every instance, if the confiscated car is not claimed within a certain time, the city sells it at auction.

In Oswego, N. Y., the Commissioner of Public Works has the power to order the removal of such vehicles.

Cleveland affords an excellent example of the many cities that have no impounding ordinance but confiscate automobiles when necessary. That city reports:

"In the downtown area where traffic is heavy we have an ordinance allowing one-hour parking. If we find violators who remain more than one hour, they are given a notice to appear at the Division of Traffic, where they are allowed to pay $2. If a car is left for three or four hours, it is towed to the central police station, where it is held. When the owner calls for it, he is compelled to pay $2 for each extra hour the car was parked.

"The Police Department does not store any car, but has an agreement with the Cleveland Auto Club, which has several authorized garages located in all parts of the city, to tow and store cars taken from the highways. Regular rates for pleasure cars and trucks are in effect. Automobiles held as evidence by the Police Department are sent to a private garage, where storage is 65 cents per day for the first three days and 50 cents per day thereafter.

"We have no difficulty in enforcing this regulation, which is just an agreement."

FORWARD STEPS

Reported by

Municipal Officials, Chamber of Commerce Executives, and Others

A Greek Theater with Modern Improvements

Los Angeles, Calif.—"A 1930 Model" Greek theater with elevator service, hot and cold running water, an emergency hospital, kitchen and dining room for the cast, garage and other ultra-modern facilities are the plans of the Los Angeles Board of Park Commissioners, who have awarded the contract for the erection of the structure to Orosel & Kitchen, Ltd., for $131,742.

The history of the project is rather interesting, due to the long period of time which has elapsed since it was first made public. In 1912, Colonel Griffith J. Griffith, who originally donated Griffith Park to the city of Los Angeles, offered to provide the funds and erect a Greek theater in the Vermont Avenue Canyon of Griffith Park. Differences of opinion between the donor and the Board of Park Commissioners of that time caused the first delay. Later the donor was taken ill, and died in July of 1919. He left a will in which it was stipulated that the sum of $100,000 should be used for the Greek theater. Several years went by before the estate was settled, and the sum accumulated interest, so there is now available $120,000.

The Board of Park Commissioners made an extensive survey of Greek theaters and found numerous improvements were essential in order to secure better productions. They then proceeded to prepare, in their own offices, a set of plans which will probably prove an innovation for structures of this kind.

The building is not exceptionally attractive as to exterior appearance. It is of Greek architecture, 110 feet in width and 59 feet in depth. The stage is 70 feet in width between the wings of the building, with a depth of 47 feet. The seating capacity is estimated at about 5,000. The unique features, all hidden from view, are located either within the building or beneath the seating area. A huge basement occupies all of the area beneath the stage and the seating section. This is entered by means of a tunnel, which has a private driveway from Vermont Avenue, the street which passes the building. The tunnel enters the garage, which has a capacity of 42 cars.

On the left inside the garage is a two-room emergency hospital so located as to make it readily accessible. On the right of the tunnel entrance is a large area set aside for the storage of properties. Immediately in front of the tunnel entrance within the building is a large freight elevator, capable of handling an elephant, if necessary, and lifting it to the level of the stage floor. The further, or north, side of the garage, houses the transformers and other electrical equipment, adjoining which are several rooms, one to be used by the ushers, and others arranged as a kitchen and dining room for the convenience of the cast, this idea being taken from the Pasadena Community House. The entire section along the west side of the garage provides public rest rooms and comfort-station facilities for the convenience of the audience.

Beneath the stage are located the large dressing rooms for the chorus, adjoining which are costume rooms, sewing and cutting rooms and even a room where cloth may be dyed. The orchestra room and toilet accommodations are also located beneath the stage. The scenery rooms are located on each side of the stage and are about 18 feet wide and 54 feet in depth. A large panel of the side wall, on each side of the stage, is so constructed as to permit its being revolved to allow large pieces of scenery to be moved onto the stage with ease.

The stage floor, or first floor, as it is called, has a large reception lobby; adjoining is a business manager's office on one side and a production manager's office on the other. Four dressing rooms are also provided. A large rehearsal room, dressing rooms, organ and radio rooms occupy the second floor.

The structure is so designed as to permit the utmost efficiency in the presentation of any type of production, from sym-

A GREEK THEATER WITH GARAGE, ELEVATOR AND RUNNING WATER

phony concerts to pageants, even including a one-ring circus.

It is estimated that it will require nine months for construction purposes and unless something unforeseen develops, the summer of 1930 should see the theater in use.

The estimated cost of the completed project is about $200,000. The Board of Park Commissioners appropriated the balance over the $120,000 available for the project.

It will be very interesting to observe the many uses to which this innovation in Greek theater construction will undoubtedly be put.

VAN M. GRIFFITH,
President, Board of Park Commissioners.

THE HINSDALE MEMORIAL BUILDING SERVES AS HEADQUARTERS FOR MUNICIPAL COMMUNITY ACTIVITIES

Popular Subscription Gives Hinsdale a Superb Memorial Municipal Building

HINSDALE, ILL.—The Hinsdale Memorial Building was erected by popular subscription and presented to the village for use as a municipal headquarters as well as for community purposes. It houses the village offices, the Public Library, the American Legion and the Women's Auxiliary, the Boy Scouts and the Girl Scouts, the public health center, etc. Its central rotunda is known as the "Shrine of Memory" and has been dedicated to the soldiers and sailors of the World War. Its central feature is a symbolic figure of Victory, carved by Oskar Hansen, and erected at a cost of $10,000.

The building occupies a commanding site on a hill overlooking the railroad station. The grounds, a complete block in extent, were village owned. After the structure had been completed and paid for by the citizens, it was felt that so handsome a structure deserved an appropriate setting. Hence a second drive was conducted, and an additional sum of $12,500 collected. This assured the landscaping of the entire block, and the placing of a four-dial clock in the cupola of the building, which was dedicated on July 4.

The contract price of the building, exclusive of the Victory sculpture, was $153,000. The property is regarded as easily worth $275,000, and is considered one of the most beautiful and stately municipal buildings in the country.

T. R. WEDDELL.

Grade-Crossing Problems Solved by Cooperation

MONROE, LA.—This city recently completed arrangements with the Illinois Central Railroad for the improvement and relocation of certain of its rail facilities, which will considerably relieve traffic congestion in the business district and foster a more orderly development of Monroe.

The plan adopted resulted from cooperation and an intelligent approach to the problem on the part of both the city and railroad. Consequently, a brief outline of the local grade-crossing situation and the manner in which it was solved, may prove of value to other cities confronted with similar conditions.

Monroe is served by the Illinois Central and the Missouri Pacific Railroads, each of which has its own depot. These two lines cross each other, the former passing through the business district and over the Ouachita River into West Monroe, while the latter goes around the business section. Between the Missouri Pacific and the river, the Illinois Central crosses eight important streets at grade. Seven of these crossings are in the heart of the business section. DeSiard Street, the main thoroughfare, crosses the tracks at Sixth Street.

To switch the shops and yard tracks, it is necessary for the trains to pass constantly over DeSiard Street, resulting in innumerable delays to vehicular and pedestrian traffic. A survey disclosed that during a 12-hour period there were 180 train movements over that street. Similar delays have been encountered at other grade crossings, particularly at Second and Walnut Streets. The distance between these streets is about 300 feet, considerably less than the length of most passenger trains passing through the city. This fact makes it necessary to cut the trains to avoid completely blocking the streets east and west of the depot. This maneuver, naturally, has increased the number of movements over the crossings.

Because of the topography of the section and other important considerations, a separation of grades would have involved a tremendous expenditure and seriously hampered industrial development. A plan was prepared showing how the tracks serving the shops and freight terminals might be rearranged to eliminate practically all of the switching movements over the DeSiard Street crossing. As a result of this project, only 15 crossings each 12 hours are to be made at that point, these being due to movements of through trains. A new passenger station just east of Sixth Street and adjacent to the freight terminals is to replace the old depot at Second Street, thus improving the crossing conditions at Second and Walnut Streets.

This plan for immediate relief will not require any expenditure by the city, but about $250,000 by the railroad. The grade-crossing elimination project, on the other hand, would have obligated the city to spend several hundred thousand dollars and the railroad about $1,500,000. If this proposal had been pushed by the city, it is likely that the railroad would have resisted, because of the immense expenditure involved, and the much-needed relief might have been postponed indefinitely.

Much of the success of such negotiations depends, of necessity, on the plans developed by the city or community involved. Thus too much stress cannot be laid on the importance of obtaining the services of engineers who are competent and who will develop a practical rather than an idealistic solution, when desirable. In this instance, M. H. Doyne, Chief Engineer of C. E. Smith and Company, consulting engineers, of St. Louis, Mo., was retained.

ARNOLD BERNSTEIN,
Mayor.

Underground Pedestrian Concourse for Philadelphia

PHILADELPHIA, PA.—In connection with the new Broad Street subway, plans have been evolved by the Department of City Transit of Philadelphia for the construction of an extensive concourse under Broad Street from Race Street to Spruce Street, and under and around City Hall, at Broad and Market Streets. A part of this concourse has already been constructed in the form of two underground passageways between Race Street and City Hall and between City Hall and Spruce Street.

The location of City Hall on a spot isolated and surrounded by streets carrying very heavy traffic made it desirable to provide means for pedestrians to gain access to the surrounding district without encountering this traffic, as well as to provide a sub-surface link connecting the north - and - south underground passageways. The adoption by the Pennsylvania Railroad of plans for new terminal facilities, including abandonment of the present Broad Street Station and the construction of a new underground subur-

ban terminal at Filbert Street, gave additional impetus to the plan.

At present, both the high-speed and subway-surface cars of the Market Street Subway line encircle City Hall by way of the underground loop shown in the accompanying illustration. The first step in the construction of the concourse involves the building of a new section of two-track subway to carry the Market Street subway high-speed tracks under City Hall on the line of Market Street, and to provide a pedestrian passageway on either side of the tracks. The Market Street subway high-speed trains will then be operated directly through this new section, and the space in which the high-speed tracks are at present located in the inner loop will be occupied by the subway-surface car tracks, now located in the outer loop. This re-location will constitute the second step. The third step will be the reconstruction of the outer loop, thus vacated, as a pedestrian passageway connecting the existing passageways in North and in South Broad Street and the passageways to be constructed northwestward from City Hall to the new Pennsylvania Terminal in Filbert Street, west of Broad Street, and eastward from City Hall to the Reading Terminal at 12th and Market Streets.

When the entire underground concourse system has been completed, as outlined, it will be possible for patrons of both the Market Street and Broad Street subways and both the Pennsylvania and Reading Railroads, as well as those of future east-and-west subways located in Arch, Chestnut, and Walnut or Locust Streets, to interchange from one line to another without coming to the street level and making their way through the heavy traffic. It is expected that the adjacent large retail stores and office buildings will construct underground connections to the concourse. The walls of the concourse will be finished in a manner that will harmonize with the finish of the subway stations; the passages will be brightly lighted; natural ventilation will be provided; and public comfort stations will be installed at convenient locations.

Approximately three years will be required to complete the concourse, and the total cost is expected to be about $6,000,000.

C. E. MYERS,
Director, Dept. of Transit.

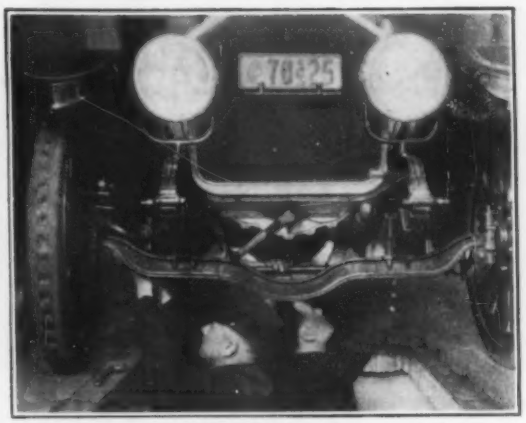
Provide Repair Pit at San Francisco Fire House

SAN FRANCISCO, CALIF.—A labor-saving feature of the fire station that houses Truck Company No. 1 of this city is a special repair pit from which the apparatus may be serviced without removing it from the station.

This pit in the floor of the fire house ordinarily is covered with a heavy plank which is removable when the firemen desire to repair the motor truck. A portable platform in the basement is then moved up under the floor opening and, by standing on this platform, the men have easy access to the under portions of the machine, as shown in the accompanying photograph.

Due to this system, no gasoline accumulates on the floor, as all dirt, oil and refuse from the truck passes down through the pit into the basement and then into a sump under the basement floor. The sump is connected with an automatic centrifugal pump which pumps all the refuse into the sewer.

C. W. GEIGER.



APPARATUS REPAIR PIT IN SAN FRANCISCO FIRE HOUSE

Stop Children from Begging Rides in Minneapolis

MINNEAPOLIS, MINN.—The newspaper publicity given to the Mayor's recent order to the police to arrest children found soliciting free rides and to take them into the Juvenile Court, has stopped that practice in this city.

There is a state law in Minnesota and an ordinance in Minneapolis prohibiting the solicitation of rides from motorists on the public highways. While there has never been any particular complaint about adults pursuing this practice, children doing so have proved very annoying. It has not been uncommon to see groups of boys and girls, between the ages of 6 and 16, lining the highways in the outlying sections of the city in an attempt to induce motorists to give them a lift. In many instances, the children were coming from bathing beaches and were dressed only in their bathing suits. In some cases, they would stand in the middle of the road in an endeavor to stop passing motorists.

This practice proved very objectionable, for when a motorist slowed up or stopped to pick up the children, serious accidents often were barely averted and traffic was delayed. In addition, there was the ques-

PART OF THIS UNDERGROUND CONCOURSE FOR PEDESTRIANS IN PHILADELPHIA HAS BEEN CONSTRUCTED

tion of the legal liability of the owner of the car should any of his picked-up passengers be injured. Finally, there was the problem of irresponsible persons taking advantage of young girls who begged rides.

Since the police were ordered to arrest all offenders, however, there has not been a single complaint.

WILLIAM F. KUNZE.
Mayor.

Farmers Raise Fund for Rural Fire Apparatus

SYCAMORE, ILL.—For more than a year, the Fire Department and city officials of Sycamore considered means to provide satisfactory fire protection for residents of the more sparsely settled sections and for farmers living within a radius of from six to eight miles of the city boundaries.

It was decided that a modern pumper was needed, and to raise the $4,450 required to purchase the desired apparatus and equipment, subscription lists were circulated among the farmers interested in such protection. The sum was oversubscribed by about $300 when 83 individual subscribers contributed an average of $54 each. In raising the money, the community was organized, as has been done in other rural regions, by A. V. Rothwell, a representative of the Boyer Fire Apparatus Co., of Logansport, Ind., from which the City Council of Sycamore purchased a 300-gallon-per-minute pumper on a 1½-ton, 6-cylinder truck, with a four-speed transmission, and capable of making 50 miles per hour. The hose body has a capacity of 800 feet of fire hose. The apparatus carries a 20-foot suction hose, with strainer; a 40-gallon chemical tank, with 60-gallon booster tank; 150 feet of regular hose; chemical hose; a 24-foot extension ladder; a 12-foot roof ladder; three searchlights; a siren; pike poles; water buckets; lanterns; two 3-gallon hand chemical tanks; a pick-axe, and crowbar.

The extra money subscribed will be spent for additional hose and equipment. Only two or three city firemen are required to man the truck, as volunteers are always available. A few weeks after its installation, the truck answered its first call, from a subscriber living 1½ miles from the city. The run was made in three minutes and owing to the protection afforded by the new equipment, a barn and granary were saved from destruction by a fire which originated in a large hog house. The subscriber and his neighbors expressed themselves as well pleased with the service.

FIRE TRUCK PURCHASED BY FARMERS AROUND SYCAMORE, ILL.

The addition of this truck to the local Fire Department renders Sycamore one of the best-equipped cities with a population of 5,000 in the state. The department now has four pieces of motorized apparatus, including one triple-combination pumper, with a capacity of 600 gallons per minute, another such pumper with a capacity of 300 gallons per minute, and a chemical truck with a high-pressure turret nozzle. Fire losses have been extremely low in this city during the past year.

JOHN G. COX, Secretary,
Chamber of Commerce.

New Municipal Building Houses American Legion

VENTNOR CITY, N. J.—Our new Municipal Building is in Tudor style. It is built in the center of a very desirable residential district, with beautiful homes around it. The city officials, therefore, wished it developed along lines which would harmonize with rather than destroy the character of the neighborhood. Therefore it was built as nearly like a residence as possible.

The building is 220 feet over all, and is 50 feet wide. The one end which is used for municipal purposes provides ample room for expansion for the next 15 years. The other end we have given to the James Harvey Post No. 144, of the American Legion, as its headquarters. This was presented furnished and ready for occupancy, joint dedication services being held on June 15. We feel that we have taken care of our American Legion boys in a very unusual fashion, and that our building is one that we can all be proud of. It was completed at a cost of something over $194,000, and has three stories and a basement.

ISAAC B. SWEIGART,

THE VENTNOR MUNICIPAL BUILDING HARMONIZES WITH THE RESIDENTIAL NEIGHBORHOOD

Artificial Lake Will Provide Water-Supply and Recreation

MITCHELL, S. DAK.—Our city, with slightly over 12,000 inhabitants, has voted a $350,000 bond issue for the creation of an artificial lake which will provide exceptional recreation facilities for its citizens and for those of the surrounding country. This lake is most conveniently situated, being just one mile from the city limits. Its purpose is, first, to furnish an adequate water-supply for the city, and second, to provide recreation grounds. With the exception of about a mile of shore line abutting upon 200 acres of land lying close to the city, the entire shore line will be devoted to cottage sites. A boulevard will be constructed entirely encircling the lake and in all probability small parking places will be laid out along the shore. The 200 acres reserved by the city has been laid out as a recreation area for all the people. The plan for its development consists of a 3,000-yard nine-hole golf course, a bathing beach capable of accommodating as many as 1,500 people at one time, an area for athletic contests and events, and boat landings, club houses, picnic shelters, a band stand and a municipal dance hall. The plans called for the planting of trees and shrubbery, as the open prairie is

without such growth; 2,500 trees have already been planted. An old Indian village which is one of the historic sites in this section of the state will be preserved.

The lake contains about three billion gallons of water, and has a shore line of approximately 13½ miles.

To safeguard the water-supply from our lake against contamination caused by bathers, bids were let to install the very latest approved type of filtration and chlorination plant, costing $128,271. A 16-inch main will bring the water into the city. The water will contain only 9.1 grains of hardness. The work for this plant was commenced early in August and will be completed in February, 1930.

CARL I. ROLSTON, Secretary,
Chamber of Commerce.

ARTIFICIAL LAKE IN MITCHELL, S. DAK.

Mechanical Bluecoat Directs Traffic in Wilmington and Saves the City's Money

WILMINGTON, DEL.,—When it was realized that the daily economic and personal loss from decreased street efficency in the United States was running into great sums of money, the search for ways of relieving congestion became very active.

The first and most familiar means of traffic regulation is the placing of officers at intersections for the purpose of expediting the movement of traffic and protecting pedestrians. This has proved satisfactory on certain streets, but with the continued tremendous output of automobile manufacturers, it has become necessary to add more and more to traffic division, resulting in an enormous municipal outlay.

In seeking to lower the cost without decreasing street efficiency, the pre-timed signal light has been introduced. The installation cost of this mechanism is lower than that of maintaining a traffic squad, but at times traffic has been unnecessarily held up. Serious accidents have occurred at intersections where motorists who were irritated by being delayed for no apparent cause have attempted to cross the intersection before receiving the green signal and have crashed into other vehicles. The pre-timed mechanism has tied up long streams of traffic at intersections where the light was observed but where it seemed safe to proceed.

Then came the mechanical bluecoat, brought forth by a group of Yale engineers who claimed that this robot would direct traffic more efficiently than a trained traffic officer and would regulate a signal light in exact accordance with the varying flow and volume of traffic in the streets. These claims were received with skepticism, and proof was demanded. It seemed highly improbable that any mechanism could be devised which would be capable of "seeing," "thinking," "remembering," and "receiving instructions." But many who have seen the system in operation in Wilmington and other large cities believe it to be a most important development in traffic regulation.

The entire downtown area of Wilmington is controlled by the Electro-Matic signal light, and the use of traffic officers on Market Street, the city's busiest thoroughfare, has been discontinued and the officers have been transferred to regular patrol duty. The robot has speeded up trolley traffic by more than three minutes over a length of ten blocks. As all but two of Wilmington's trolley lines run on Market Street, the gain in time is remarkable.

A great money saving has been effected by the city. Formerly it was necessary to have two shifts of traffic officers on Market Street, but with Robot on the job efficiency and time saving are obtained 24 hours a day at much lower cost.

GEORGE BLACK,
Superintendent of Public Safety.

DOWNTOWN BUSINESS DISTRICT, WILMINGTON, DEL.

Intelligent Service to Tourists

GRAND RAPIDS, MICH.—The first free municipal information booth in the state, established in Campau Square in Grand Rapids, has been serving an average of 250 tourists and visitors each day during the past summer. (See page 135.)

Special city policemen, trained to supply information on almost any subject conceivably of interest to the visitor, man this picturesque and important little house. Other cities have followed the example of Grand Rapids and today there are similar information centers in nearly every Michigan municipality and town.

Many motorists stop at the local booth for information on road conditions, the location of summer resorts and hotels, the shortest routes to lakes and streams offering good bass or trout fishing. Some of the tourists even want to know what size perch may be retained by fishermen, when the trout season ends, where they can get a good meal for a certain price, where they can find a dentist, and where one can purchase a golf outfit, a necktie or even a pair of socks.

The officers in charge keep themselves informed on just as many of these subjects as possible. They also distribute literature, including an illustrated folder about Grand Rapids, issued by the Association of Commerce and containing maps of the principal state highways, cities and resorts.

Michigan has enjoyed a record number of tourists during the summer, and the Grand Rapids information booth has proved a great convenience. The fact that the booth is constructed so cleverly and is located in the heart of the business section serves to attract tourists who otherwise might pass through without stopping.

LEE H. BIERCE,
Secretary, Chamber of Commerce.

Is Prequalification of Contractors Necessary and Constitutional?

By DAVID C. BOSWELL
CIVIL ENGINEER, RIDGEFIELD PARK, N. J.

THERE has been considerable discussion among engineers and the press regarding a law in New Jersey permitting prequalification through the use of a questionnaire submitted to contractors wishing to secure plans in order to bid on public work.

By way of explanation:

"Prequalification" of contractors is the qualifying of them before they are presented with plans and before bids are received. "Postqualification" is the qualifying of contractors after the bids are received, so as to determine the lowest responsible bidder.

Prequalification is far inferior to postqualification as a guide to contract bond underwriters because prequalification omits the most important factor in contract bond underwriting—the adequacy of the contract prices. It is only after bids have been opened that surety underwriters can make an aggregate estimate of the probable success or failure of a contractor on any extensive piece of work.

Authority for Use of Questionnaire

Chapter 180, New Jersey Laws of 1926, makes it lawful for any "officer, board, commission, committee or department or other branch of any municipal government . . . to require from any person proposing to bid on public work duly advertised a standard form of questionnaire and financial statement containing a complete statement of the person's financial ability and experience in performing public work before furnishing such person with plans and specifications for the proposed work duly advertised."

This extraordinary statute seems to be designed to shut out competitive bidding for public work and therefore to make such work more costly to the taxpayer. The purpose of competitive bidding on public work is to invite as many responsible contractors as possible to estimate on the work so as to get it done as cheaply as possible and save money for the public treasury. The old contracting firms are constantly passing out of the picture and their places must be taken by new firms containing new blood and new money. This statute would shut them out because of lack of "experience."

It is my opinion that if a state or a political subdivision of a state enacts any law or establishes a practice which permits any state or municipal officer to pass upon a contractor's qualifications to do a job before the contractor is given the plans and specifications for the work, a vicious practice of class legislation will be established. State or municipal officers, including engineers who have charge of contract work, may be particularly skilled in relation to their own work or profession, but in many cases they are not in a position to pass justly on the question as to whether a contractor, after obtaining the plans and specifications in order to make a bid, will be able to do the work satisfactorily and give a bond guaranteeing the performance of the contract. To establish such a practice is un-American in spirit, particularly in municipal work. Each person stands equal before the law and is entitled to engage in any lawful business.

A Much-Discussed Requirement

In various parts of the country the procedure in carrying out public works projects by contract has been changed lately to include a further restriction as to contractors desiring to do the work, requiring that they "prequalify," or establish their ability and responsibility to the satisfaction of the authorities, before they are permitted to bid, rather than after. The accompanying article is an abstract by the author of his criticism of this practice, as provided for in New Jersey by a recent law, before the Association of Municipal Engineers affiliated with the New Jersey State League of Municipalities.

A brief discussion of this subject, based on favoring opinions from Philadelphia, occurs at page 17 of this issue. A more extended treatment can be found at pages 160 and 161 of the April issue.

An Unfair and Unnecessary Restriction

If one is not able to procure plans and specifications, he certainly will not be able to make a bid for the work, and what state and political subdivisions are interested in, is to have the work done satisfactorily according to plans and specifications at the lowest price. This means free competition and equality before the law. The time to pass upon the responsibility of a contractor and the time to judge to whom the work shall be awarded is after the bids have been received.

I further believe that this requirement is unnecessary. Every bidder has to furnish cash or certified check with his bid to be applied to any loss sustained if he does not sign up. He has to furnish a bid bond to further secure the municipality. If successful, he has to furnish an approved contract bond, and often after that a maintenance bond. With this security all the way through, there can surely be no occasion to pry into his bank balances, notes, real estate or other personal matters.

Unconstitutional Delegation of Authority

Furthermore, it is a delegation of delegated authority and so unconstitutional. Local municipalities are operated by some sort of governing body. This body gets its authority from the state by specific laws. Now comes the Questionnaire Act and places discretion in an employee of the governing body. There is recourse to the courts against any unfair act of the governing body, but until the Supreme Court rules directly on this Questionnaire Act there is no review of the engineer's refusal to deal with all contractors equally. If, however, the engineer shows the questionnaire to others, then every contractor's affairs are exposed, to a degree, and often get to his competitors whether he bids or not. The most vicious forms are the ones gradually slipping into some towns which compel a bidder to name his material men or even get a letter from him to the effect that he will furnish the materials.

It is the contention of some engineers that the bonding companies are not affording the required protection, and for that reason these engineers feel that they are obliged to go into a man's financial condition, experience and ability and to take it upon themselves to pass upon a contractor's responsibility, determined through the answers to certain questions in the questionnaire; if the engineers are not satisfied with the sufficiency of the answers, they will refuse him the right to receive a set of plans and bid on the work, even though the bonding companies are satisfied with him and are willing to give a bid bond and financial support on the work.

I am personally satisfied with the protection afforded by the bonding companies and feel that the questionnaire is not at all necessary and not in the interest of the taxpayers.

Layout of Cross Roads, Junctions and Corners

New Recommendations Promulgated by the British Ministry of Transport

ON September 17, 1929, there was sent to all road authorities in England a Report on the Layout of Cross Roads, Junctions and Corners, with a note from the Minister of Transport, expressing his agreement with the recommendations contained therein. The Report had been drafted originally by a subcommittee of the Town Planning Institute, consisting of H. T. Chapman, Surveyor to the Kent County Council, and A. Dryland, President of the Institution of Municipal and County Engineers. In preparing the final draft the Town Planning Institute received valuable suggestions from officers of the Ministry of Transport and from the Institution of Civil Engineers, the Institution of Municipal and County Engineers, the Institute of Transport, the Royal Institute of British Architects, the Roads Improvement Association, the County Surveyors' Society, and the Surveyors' Institution.

Believing that this British document will be of no little interest in the United States for study in connection with the article published in the September and October issues of this magazine on "Abolishing Street Traffic Intersections Without Grade Separation," by Fritz Malcher, the Report is here published in full. American readers will, of course, bear in mind the fact that driving in England is on the left side of the highway, so that for use in the United States the position of the arrows in the accompanying diagrams would be reversed.

Text of the Report

(1) The growth of motor traffic—which has not yet approached its maximum in this country—has produced and is producing an entirely new set of circumstances. Therefore, not only the design of streets but also the methods of land development must be adapted to these circumstances and brought up to modern requirements by those developing estates and by those responsible for schemes of redevelopment or street improvement. This is necessary not only to avoid congestion of traffic, by which the improvements in mechanical traction are largely stultified, but also for the safety and comfort both of pedestrians and motor users.

(2) The improved system of highways that is gradually being evolved, at considerable expense, is one of the most notable achievements of this country since the war. It is therefore of great importance that provision should be made so that these roads may function to the full extent of their possible efficiency and that their appearance should be worthy of their importance.

The general question of road design and choice of route has received a good deal of attention, but, unfortunately, the efficiency of some of the splendid new routes and improvements that have been carried out is already being impaired through lack of control of adjoining development. Also, in some cases sufficient attention does not appear to have been given to amenity, either in original layout or, more frequently, in respect to the buildings that are now being erected alongside.

(3) The following proposals relate generally to arrangements and devices, at road corners and junctions, simple and economical in application. Indeed, if, when plans are made, the principles here enunciated are borne in mind from the first, speed and safety should be secured and incidentally, values generally should be improved. Also, the need for traffic control should be greatly reduced and annual cost of supervision thereby saved. Consequently, reference is not made to such devices as fly-over junctions or double-decked streets or footways (except where they are the natural outcome of differences in level), that may be admirable in themselves but are likely to involve large expenditure in construction, at present only justified in exceptional circumstances.

Unless careful attention is given to these details, it is to be feared that adequate results will not be obtained from the large sums of money that have been, and must be, spent on the highways of this country.

The plans illustrating this memorandum are intended as examples only and do not pretend to embrace all possible types. Also, variation will be necessary to suit local circumstances, provided the essential principles are always observed.

(4) The growth of motor traffic makes it essential to secure spaces at road junctions on the scale indicated on the plans. It is not, however, suggested that this space should be laid out, immediately, in the manner indicated. For example, no obstructions for the purpose of directing the flow of traffic must be erected until adequate lighting is available. On grounds of economy and to avoid subsequent disturbance of property, the matter of first importance is to insure that adequate space will be available for the appropriate type of junction when traffic requirements make its construction necessary.

(5) In order to avoid interference with the flow of traffic and minimize the chance of accidents, it is desirable that on main traffic routes the number of crossings or road junctions should be reduced to a minimum and should be at least a quarter of a mile apart. In some places the application of this principle will necessitate the amendment of local by-laws, or their variation by town planning schemes.

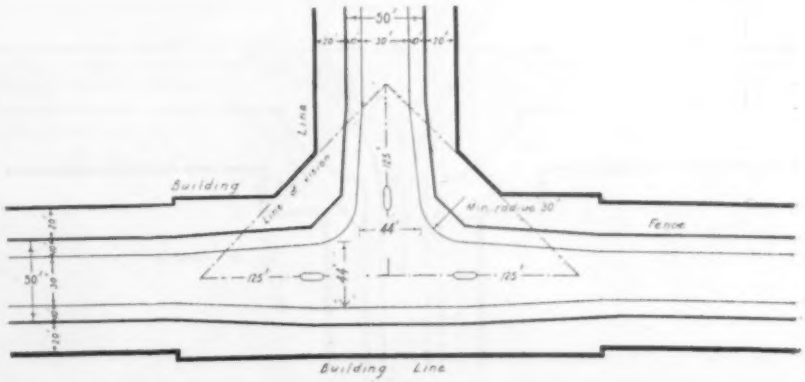
Footpath access to the main road can of course be provided at more frequent intervals.

The land through which a main traffic route passes should be laid out so that, for the convenience of residents, local traffic is directed to these infrequent junctions or crossing places. In built-upon areas, redundant side streets might with advantage be closed, except for a space for pedestrians, and in re-development schemes parallel routes should be opened out for local traffic.

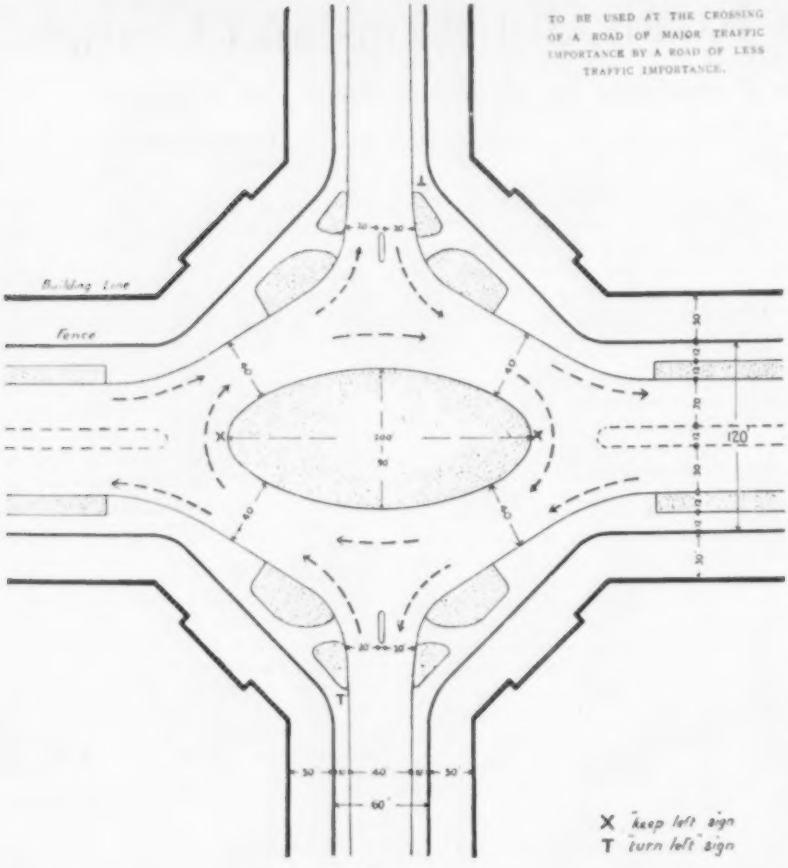
(6) In order to obviate traffic congestion, multiple road junctions should be avoided except where there is ample space for the successful application of the roundabout principle.

Acute-angled junctions are bad both from the point of view of traffic and of estate development. It is therefore desirable that so far as possible all side streets should join main thoroughfares at right angles. This can readily be arranged when planning new streets, and existing side streets should be altered to conform to this principle as and when practicable.

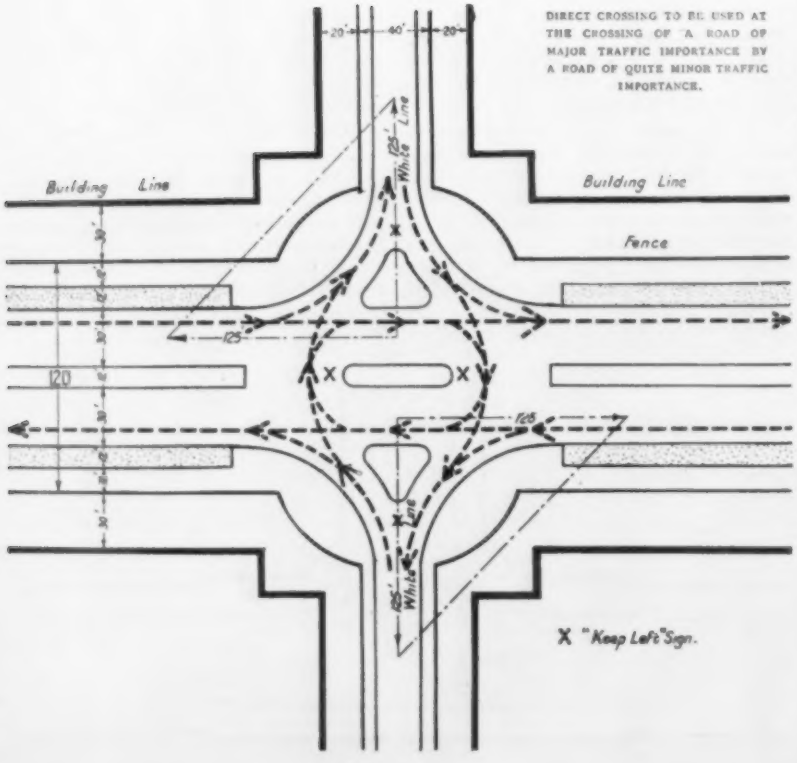
(7) In order to give a sufficient width of vision for safety of traffic, buildings should be set back at the corners of the junctions of all important roads, behind lines crossing each corner and connecting points in the centers of the respective roads, 125 feet back from the point of intersection of their center lines. (See Plan 1.)



PLAN 1


TO BE USED AT THE CROSSING OF A ROAD OF MAJOR TRAFFIC IMPORTANCE BY A ROAD OF LESS TRAFFIC IMPORTANCE.
Building Line
Fence
X "keep left" sign
T "turn left" sign

PLAN 2a


DIRECT CROSSING TO BE USED AT THE CROSSING OF A ROAD OF MAJOR TRAFFIC IMPORTANCE BY A ROAD OF QUITE MINOR TRAFFIC IMPORTANCE.
Building Line
Building Line
Fence
White Line
X "Keep Left" Sign.

PLAN 2b

It is recognized that this will require buildings at crossings to be set back somewhat further than has been customary in the past. Therefore, the principle can be applied fully only in areas at present undeveloped. The old-fashioned form of building development was wasteful and unsightly at corners. By careful plotting of buildings, economy can be effected and attractive road entrances can be arranged.

(8) In addition to the prescription of setbacks or building lines (30 feet on main roads), there should be regulations governing the height of fences and prohibiting the erection or continuation of advertisement boarding at corners, and requiring that hedges, trees or shrubs shall not be permitted to grow in such a manner as to obscure the view from one road to another.

Where roads meet at a junction on a steep gradient, even a low fence or hedge may obscure the view. Therefore, each junction needs to be carefully surveyed and if necessary, the front fence or hedge should be omitted, or the fence line set back to the line of vision referred to above.

It should be noted that railings consisting of vertical bars cannot always be seen through, because when viewed from some angles the railings appear solid.

(9) It is undesirable that obstructions such as pillar boxes, sand boxes, telephone call boxes, electric junction boxes, lamp standards or trees should be placed at the outside edge of the footway at the corners of streets. Inspection manholes should also be kept clear, especially those which when opened are temporarily covered by a booth. In busy centers a wide distribution of illumination and a minimum of obstruction may be achieved by the use of lights suspended over the carriageway.

(10) Except just at junctions, tree-planted grass margins are a most desirable adjunct to a road. They not only secure longer notice being given to a driver before a pedestrian steps into the road, but the pedestrian enjoys the comfort of being further removed from rapidly passing traffic, and also the amenities and beauty of the road are greatly enhanced. The trees in the grass margin should be planted away from the curb and as near the footpath as possible. Frequently when a widening is carried out, it is advantageous to preserve the existing hedge and trees by placing the footpath behind them. In this way, when a road is carried through a cutting or on an embankment, it is often possible to arrange the layout in such a way as not only to save expense but also to increase amenities and safety, by keeping the footpath at the original level, or at a higher or lower level than that of the carriageway.

(11) When there is congestion at important existing cross roads, where the frontage is built upon and the cost of providing space for a roundabout would be prohibitive, minor improvements should, if possible, be carried out to subsidiary roads, and sign-posts erected, so that traffic desiring to pass from one cross road to the other may be able readily to avoid the crossing.

(12) Where a minor road crosses a major one, the minor road should either be staggered and space provided at the entrance of the subsidiary road, so that traffic can reconnoiter before emerging from the minor into the major road, as shown on Plan 3, or the entrance to the minor road should be opened out and in the center of each space so provided, an obstacle should be placed, e.g., a grass plot with central lamp standard, that will cause traffic approaching from the minor road to slow down. See plans 2a and 2b. Staggered crossings should always be arranged on the principle of Plan 3, namely, so that the intersecting roads are sufficiently separated and that vehicles shall turn to the left on entering the main road.

The form of junction shown on Plans 2a, 2b and 3 is only properly applicable in the case of areas subject to town planning schemes, as it is only in such areas that the authority can be assured, by reason of the layout of the minor roads and the zoning of the adjacent land, that such roads will always remain subsidiary in respect to traffic.

Provision must be made for lighting all obstructions, such as street refuges. This is a separate matter from ordinary street lighting, and devices are available which can be used satisfactorily even where gas or electricity are not laid on.

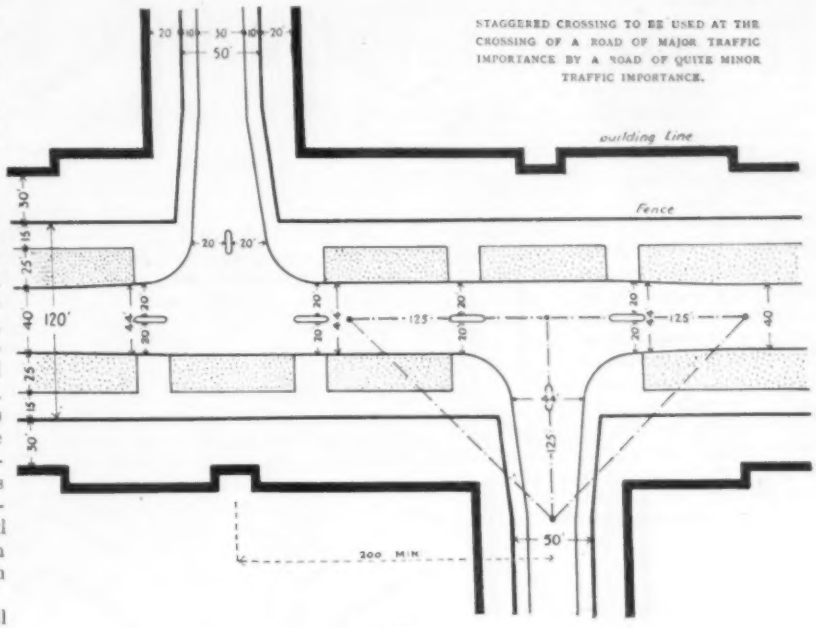
(13) At crossings of one or more major roads, space should be provided for traffic to circulate on the roundabout system. In order that such a method may be efficient, there must be room between the points of junction for the traffic to sort itself out, so that the vehicle taking the next turning can get next to the curb, without holding up the general stream of vehicles of which it is a unit.

Conditions vary so much that no one system can be universally applied, but a flat-sided figure seems to meet the situation better than a round one, and is of course simpler to build to. For a "four-way" roundabout, a square with a central island having a minimum width of 110 feet is suggested. See plan 4a. When a junction of more than four roads is necessary, the roads should be arranged at equal angles one to the other, and a polygon with a central island, having sides each of a minimum length of 110 feet, should be provided. See Plan 4b.

For their own safety and the safety and convenience of traffic users, it is not desirable that pedestrians should cross the roundabout, and therefore no part of the center space should be laid out as a footway, but a wide curb may be provided as an emergency refuge.

(14) Where roads approach each other, it is desirable to separate the traffic going in either direction. Where two major roads are concerned, a narrow strip or street refuge will suffice for a division, but where a minor road enters a major one, a larger area may be desirable, so that traffic may be deliberately slowed down. See Plans 2a, 2b. Also the gradient of roads should be reduced as far as possible as they near the point of junction.

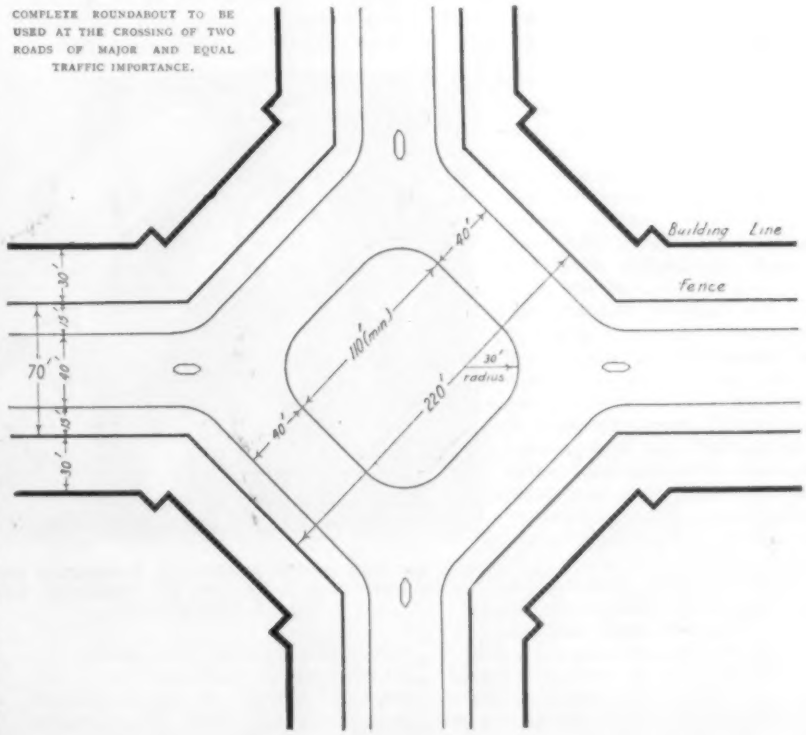
Refuges are often necessary and desirable to protect pedestrians at the junction of roads where the width of carriageway


STAGGERED CROSSING TO BE USED AT THE CROSSING OF A ROAD OF MAJOR TRAFFIC IMPORTANCE BY A ROAD OF QUITE MINOR TRAFFIC IMPORTANCE.
building line
fence
200 MIN

PLAN 3

is 30 feet, but such refuges interfere unduly with traffic. For this reason it is desirable that at such junctions the carriageway should be widened out to give the minimum width of 44 feet. A refuge can be constructed in the center of the carriageway, which then provides accommodation for two lines of traffic on each side of the refuge, and such refuges should be constructed set slightly back from the junction. In Plan 1, the refuges serve not only the safety of pedestrians but also automatically divide traffic into one-way streams, as it enters or leaves the side road. The respective carriageways are widened at the point of junction in order to allow room for the refuges.

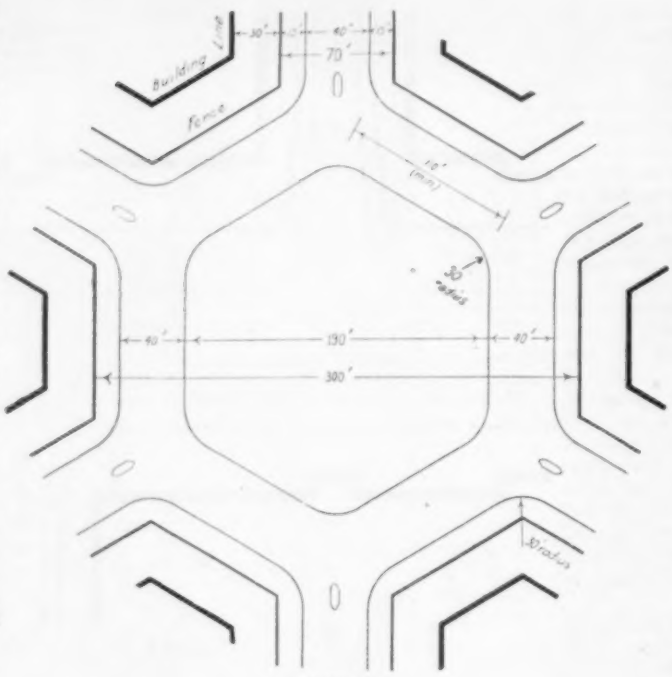
(15) When improving the corner of an existing street the fence line and curb line should be considered separately. It is important to set back the former to the full extent necessary to provide a clear view of approaching traffic. It is not desirable that corners should be taken at high speed, and this should be borne in mind when the curb line is laid out.



PLAN 4a

Also a greater width of footpath at a corner adds to the safety of pedestrians. On the other hand, the corner should be sufficiently easy for a motor to take it comfortably and without pulling out to the obstruction of other traffic. A minimum curb radius of 30 feet is necessary for this purpose.

(16) Shopping centers create and attract traffic and therefore are not from the point of view of fluidity of traffic well placed at important road junctions. Nevertheless, these situations are favored by shopkeepers, and due weight must be given to their point of view. At all shopping centers provisions should be made for extra width of footway to provide for the extra number of pedestrians and to allow room for those looking in at the shop windows to do so without impeding the passer-by. Extra width (8 feet) of carriageway is required to allow room for waiting vehicles to draw up clear of through traffic. Also it is desirable to provide an approach road and space in the rear of the shops for the tradesmen's carts and for loading and unloading.



PLAN 4b

(17) Stopping places for busses or trams should be sited so that these vehicles do not cause a block at road junctions, and should be arranged so that passengers can wait and alight in safety and comfort. In the case of refuges for passengers at tramway termini or at important tramway centers, these should be placed at the side of the tram track, and a minimum width of 20 feet of carriageway should be provided between the curb and the refuge on both sides.

(18) In planning road junctions and laying out the building lines about them, the importance of order, definite design, symmetry and simplicity should not be overlooked. Drivers of vehicles when approaching a junction at high speed should be able to apprehend its form and arrangement quickly. It is in vain to plan sweeping lines for traffic if nothing but a confused and irregular jumble of buildings meet the eye on approaching the junction. Many junctions would be much safer with a little more order and a little less space. Moreover, the general appearance of a town and its streets depends to a very large extent on the arrangement and treatment of the buildings around the street junctions, which enjoy special prominence.

Equip Berkeley Police Cars with Radio Sets

AFTER several months of experimentation, police cars in Berkeley, Calif., have been equipped with radio receiving sets so that officers may be notified of a crime just as soon as it is reported to headquarters.

All Berkeley policemen operate their own cars while on duty, spending much of their time cruising through the streets on their beats. By means of the new radio communication system, the officers on duty can be notified almost instantly if they are needed. An audible signal unit has been installed on the dashboard of each car, and the radio receiving equipment is placed at any convenient place where it will be the least noticeable. When a telephone call is received at police headquarters reporting a crime at a certain point, the desk sergeant can send out a code radio signal directing every officer on duty to communicate with headquarters through the police telephone system for orders.

If only one officer is needed, the code system will indicate him by signal. The radio signal code can be heard by the policeman even if he is 100 feet from his car, making it possible for him to park his automobile in front of a restaurant and still be able to hear the signal while dining.

The receiving sets installed in the cars are of special aircraft design, and were specially constructed by Hentz & Kaugman of San Francisco. They will operate successfully as far as 60 miles from the broadcasting quarters, which consist of a 500-watt tuned plate and tuned grid transmitter arranged in a special fireproof room in the City Hall, with a remote control switch placed over the police telephone switchboard in charge of the desk sergeant at all times. This station operates on a wave length of 175.23 metres, 1,712 kilocycles.

ONE OF THE RADIO RECEIVERS INSTALLED UNDER INSTRUMENT BOARD IN CARS OF BERKELEY, CALIF., POLICE DEPARTMENT

The receiving sets in the police cars are mounted on shock-proof cradles and are easily removable as well as interchangeable. They are removed from the cars at the end of the detail and placed in a locker, the outgoing officer taking one of the receivers from the locker-room and installing it in his car when going on duty. When the receiver is placed in the shock-proof mounting cradle, connections are made automatically between the receiver, the current supply and the audible signal unit.

The entire radio system cost but $4,000, this low cost being due to the fact that much of the installation work was handled by policemen, many of whom are radio experts. The entire antenna, consisting of 60-foot towers placed 60 feet apart, was constructed by the officers.

A special code system is now being worked out to permit the desk sergeant to inform all policemen on duty of the location of a crime so that in less than a minute they will be able to proceed directly to that point, thus greatly increasing the chances of finding the culprit. C. W. GEIGER.

Regulations for Water Taps and Services—III

Abstracts from Pamphlets Issued by Municipal Water Departments and Private Companies

Altoona, Pa.

Application for water may be made only by the landlord or property owner and all municipal and highway permits will be procured and paid for by the water company. A charge of $10 is required with each application and this amount will be applied on the charge for water used while the house is being constructed. If this amounts to less than $10, a refund will be made and, if more, the applicant will be billed for the excess. All services must be provided with suitable stop and waste cock, located just inside the building. All pipes put in by the consumer must be of galvanized wrought iron or AAA lead pipe and be placed not less than 3 feet below the surface. All installation and maintenance costs of service lines and meters will be borne entirely by the water company.

Apollo, Pa.

The company will furnish the curb box, curb stop cock, service pipe from curb stop cock to ferrule coupling and the ferrule and coupling, but the owner must pay in advance any charges exacted by the local authorities for opening streets and $5 for unpaved streets and not to exceed $15 for paved streets when the application for service is made or replacing is necessary between November 15 and March 15. An inspection charge of $1 will be made by the company for inspecting all installations and repairs. No service line may be placed within 18 inches of any sewer or other trench or within 3 feet of any vault or area or pass through any premises other than those supplied. Services must be laid at a depth of not less than 4 feet below the surface. First-quality lead pipe of specified weights must be used and all joints must be made with mechanical couplings of approved design. No joint may be made within 5 feet outside of the wall of the building and no wiped joints will be permitted except at the stop cock next to the meter.

A turn-on charge of $1 will be made where water has been turned off for non-payment of bills.

Avis, Pa.

Connections from the main to the curb, including the curb stop, cock and box, will be made by the company at its cost. From the curb box to the inside of the basement wall, the service line and provision for setting a meter must be installed by the owner.

All bills are payable quarterly. A 5 per cent penalty is added to all bills 60 days overdue. If bills are not paid within 90 days, service will be discontinued and will not be again turned on until all bills and the 5 per cent penalty, as well as the actual cost of labor and material incident to shutting off and turning on service, are paid.

Easton, Pa.

The company will make all connections with the mains, and furnish, install and maintain all service lines from the main to the curb including the corporation cock, curb cock, curb box and service pipe. A brass stop and waste cock must be installed in the service pipe within the wall of the building.

Greensburg, Pa.

The company will make all connections to its mains and place the curb box, curb cock and corporation cock and the street service line from the main to the curb cock.

The charge for turning on water after shut-off for non-payment of bill or violation of regulations is $2.

New Kensington, Pa.

Service connections will be made to improved property by the company, which will tap the main, insert the corporation cock, carry the service line to the curb, and insert the curb cock and curb box.

The owner is required to furnish and install the service line beyond the curb box. This must be of lead, lead-lined, copper, galvanized or cast iron pipe to and inside the wall of the building and a stop and waste cock must be placed immediately inside the building. All service pipes must be laid at least 4 feet deep and not less than 4 feet from any open area or vault. No service pipe may be laid in the same trench with any drain or sewer pipe and must be laid at least 3 feet from any drain or sewer pipe.

If water is turned off for non-payment of bills or violations of regulations, a charge of $1 will be made for turning water on again.

St. Marys, Pa.

The water company will tap the main, insert the corporation cock, carry the service pipe to the curb, install the curb stop and service box. Each service must be provided with a suitable stop and waste cock, located between the meter and the outer wall. All service pipes must be laid at least 4 feet deep and not within 3 feet of any open area or vault.

Vandergrift, Pa.

The company will at its own expense install and maintain the service line from the main to the lot line of the consumer's premises, with shut-off cock, curb box, etc., the consumer to pay any fee charged for opening the street or highway. No service may be less than 4 feet below the surface or in the same trench with sewer or other pipes.

When water is shut off for non-payment of bills or violation of regulations, a charge of $2 is made for restoring service.

Waynesboro, Pa.

The borough will tap the main and furnish a corporation stop cock for connection to the service line. Tapping charges are $4 for a ¾-inch connection and $5 for a 1-inch connection and the applicant must also pay the municipal charge for opening the street.

The service line must be of brass pipe with lead gooseneck connection at the main and T-handle stop cock with iron curb box, and laid at least 3 feet below the pavement or street surface. It must not be covered until the tap on the main is made and the service line connected and tested. A brass stop and waste cock must be placed within the walls of the building.

The charge for turning on water after discontinuance for non-payment of bills or violations of regulations is $1.

Wilkinsburg, Pa.

All new service lines from the main to the curb, including the corporation cock or ferrule and coupling, the curb stop and couplings, the pipe from the ferrule to the curb cock and the curb box, will be furnished by the company and all service lines will be maintained by the company. The applicant must pay any charges or fees for street openings and $5 when application is made for a new service line or replacement made between December 1 and March 1. An inspection fee of $1 is charged by the company for inspection of the service between curb and building. No service pipe may be placed within 18 inches of any sewer or other trench nor within 3 feet of any open vault or area. All service lines must be at least 4½ feet below the surface. Lead pipe of specified weight or copper tubing may be used for the service line. Mechanical couplings for all joints between the curb stop and the wall of the building supplied. No joint may be made within 5 feet of the outside wall of the building and no wiped joints will be permitted except at the stop cock next to the meter.

A turn-off charge of $1 will be made when water has been turned off for violation of rules or non-payment of water bills.

Charleston, S. C.

The Commission will lay the service pipe to the curb at the expense of the owner, who is required to make a deposit of an amount equivalent to the estimate of the cost, plus 10 per cent for supervision and use of tools. If the estimate is less than the actual cost, the owner is billed for the excess, and if the amount deposited is more than the actual cost, the Commission makes a refund to the owner.

All accounts are delinquent 10 days after date, and water may be shut off without notice, a charge of $1 being made for turning it on again.

Maryville, Tenn.

The following tapping rates are charged:

⅝″ tap	$20.00
¾″ tap	22.00
1″ tap	24.00
1¼″ tap	27.00
1½″ tap	27.00
2″ tap	30.00
3″ tap	36.00

Alexandria, Va.

The Alexandria Water Co. requires a deposit of $5 when application is made for water service. For this charge the company will furnish and own a ¾-inch corporation cock and metal curb cock box.

When the main is uncovered and ready for tapping, the company will tap the main and insert the corporation cock at its expense, all excavation, backfilling and setting of curb cock box to be done at the expense of the applicant.

The service connection from the main pipe to the curb cock must be of lead unless above 2″ diameter, in which case cast iron with lead gooseneck connection to corporation cock may be used. In no case may lead pipe of less than ¾″ inside diameter be used. All service pipe must be installed under the supervision of the company at the expense of the owner. If it is installed by the company, the actual cost plus 10 per cent for use of tools and supervision will be charged. Service pipe must not be laid at less than 3 feet below the surface.

Aberdeen, Wash.

The city will make all connections to the main to the curb cock or meter inside the curb line. Where the meter or curb cock is located within 10 feet of the property line, all service pipe and connections from the cock or meter must be installed and maintained by the owner. The service pipe must be so arranged that the supply to each separate house may be controlled by a separate stop cock placed 12 inches inside the street curb. Only standard galvanized iron, copper or brass pipe may be used up to 2″. No service connections less than ¾″ may be installed. The following fees are charged for installation.

¾″ in unimproved street	$6.00
¾″ in gravel street	8.00
¾″ in paved street	20.00
1″ in unimproved street	8.00
1″ in gravel street	10.00
1″ in paved street	22.00

For each additional foot of ¾″ pipe over 20 feet, in an unimproved street, a charge of 15c is made; in a gravel street, 20c, and in a paved street, 50c. For 1″ pipe, the charges are 20c in unimproved streets, 25c in gravel streets, and 55c in paved streets. Where one main exists in a street, the charges for ¾″ or 1″ service pipe are calculated as if the main was located in the center of the street, so that abutting properties on both sides of the street pay uniform charges. For larger sizes of pipe, actual lengths only are considered, and the actual cost of labor and materials is charged.

Service pipe must be placed not less than 18″ deep, and the trench must be well backfilled.

When water is shut off or turned on for any other reason than vacancy of the premises, a charge of 50c is made.

Kelso, Wash.

Service pipe and connections from the main to and including a stopcock and meter to be placed one foot inside the curb line, will be installed and maintained by the water department, the minimum charge for a ¾″ service being $18.50. For larger sizes the actual cost of installation will be charged. In case it is necessary to make a sidewalk cut to install a curb cock or meter, an additional charge of $5 will be made. The service pipes from the stop cock to the building must be placed at least 2 feet below the surface. A stop and waste cock protected from the frost must be placed inside the property line.

All water rates are due on the first day of the month and become delinquent on the 10th. If not paid by the 15th, the water will be shut off and a charge of $1 collected.

Pasco, Wash.

For each ¾″ service or smaller, a charge of $15 is made. For service larger than ¾″ or where it is necessary to open a paved street, the actual cost of labor and material in making the installation and replacing the pavement is charged.

When bills are not paid by the 10th of the month, a penalty of 10 per cent is added, and if not paid by the 15th, the water is shut off and a charge of $1 made for turning it on again after bills and penalty are paid.

Seattle, Wash.

Where there is a main in the street, the water department will install the service pipe from the main to the property line and place a stop cock inside the curb. Where no main is laid in the street, the department will lay a connection from the main for a distance not to exceed 40 feet and permit the service to be connected with this by means of a union and pipes laid at the expense of the owner, or will extend the service to the premises along a public street at cost.

Only standard galvanized iron pipe up to and including 2″ may be used, and service pipes must be laid not less than 2 feet below the surface of the ground. The fees for installation of services are $15 for a ¾″ connection and $18 for a 1″ connection. For larger-sized connections or where it is necessary to open a paved street, the actual cost of labor and material for laying the service and replacing the pavement is charged.

If water rates are not paid when due, water will be shut off without notice and an additional charge of $1 made for turning on.

Wenatchee, Wash.

The following service installation charges include a corporation cock, lead pipe, and fittings, curb cock, curb box, meter, meter box and all other fittings used in making connections between the water-main and the property served, provided, however, that in any service more than 40 feet in length, the consumer shall, in addition, pay the cost of labor and material in excess of 40 feet:

½″ or ¾″ connection	$25.00
1″ connection	37.00
1¼″ connection	50.00
1½″ connection	65.00
2″ connection	120.00

The charge for services larger than 2 inches are based on the estimated cost of the installation. If a meter smaller than the size of the service is used, a deduction in the difference in the meter cost will be made from the above charges. The service pipes must be so arranged that the supply shall be controlled by a stop and waste cock with extension handle. All pipes on premises must be connected to the city pipes within the curb line with a union.

In case fees and charges for water are not paid within 10 days after the date of the bill, a collection fee of 50c is added, and in case of non-payment within 30 days, the water will be shut off and a charge of $1 added to cover the expense of turning water off and on.

Havoc Wrought by a Record Rainfall in Memphis

5.42 INCHES OF RAIN FELL IN 24 HOURS ON JULY 16-17, 1929, IN THIS SOUTHERN CITY

A cloudburst poured 5 inches of this rainfall on Memphis in 2 hours, stopping motor and street-car traffic for a short period. The water receded rapidly when the skies cleared

Equipment of Village Fire Departments—II

Concluding Instalment of Report of National Fire Protection Association

Maintenance

400.—Motorized Apparatus

401. a. The motor shall be tested at least once a week.

b. Operation of the motor should be for a period of at least 20 minutes.*

c. This test should preferably be conducted in the open, but if impractical, at least one set of doors of the engine house shall be open during test.†

402. The brakes should be examined and tested at least once a month and also after every run.

403. Manufacturer's instructions with respect to lubricating apparatus should be very closely followed.

404. Storage battery solution should be tested once each month and during the summer months examined weekly to see that plates are covered.

405. The pump unit of motorized pumpers shall be tested at least once every two months to see that all parts are in an operable condition.

406. All unused extinguisher equipment shall be discharged and recharged annually in accordance with the extinguisher manufacturer's instructions. During such operation of the equipment, fire conditions should be simulated.

420.—Hose

421. In order to get fire streams at work with minimum delay and also to guarantee the condition of the hose being such that there will be no apprehensions as to its ability to stand up under the stress of severe fire conditions, it is necessary:

a. To buy and install approved hose.
b. To protect hose in a suitable manner.
c. To give hose constant attention.

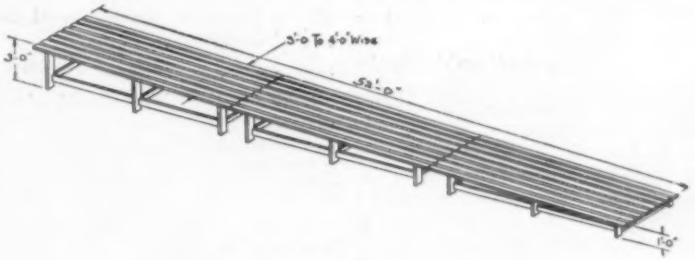
422. The hose should be well protected from the weather and the ravages of vermin.

423. Each length of hose should be numbered and a book record kept of the date of purchase, maker, and dates of periodical testing and pressures, also remarks as to condition.

424. Cotton rubber-lined hose should be carefully tested by means of a power or hand pump to not less than 150 lbs. per sq. in, or higher if the normal fire pressure is greater than 100 pounds. This should be preferably done each spring. Any faulty or defective hose, or even doubtful lengths, should be repaired, and if this is not practicable, should be scrapped and replaced at once with approved hose. Before hose is taken away for testing it should be replaced by spare hose, so that the required amount of hose will always be available.

425. After the hose has satisfactorily passed the test, it should be coiled up and placed in a tank of water and left to soak for 24 hours to soften any dirt in the jacket. Next it should be laid out on clean boards and carefully scrubbed with soap, properly washed, and rinsed. Finally it should be hung up or placed on a rack to dry. The drying must be carefully done in such a manner that water will not collect on the interior. Then the couplings should be gone over and the equipment returned to its proper location. It is also desirable to pass water under pressure direct from the pumper two or three times a year if possible.

426. A hose drying rack similar to that shown on this page is recommended. This rack is for drying hose after it has been wet either at a fire or at a test. The rack should be 52 ft. long, 1 ft. high at the lower end, and at least 3 ft. high at the upper end.*



HOSE DRYING RACK

427. The hose should be folded in such a way that air can circulate and prevent the formation of mold. Six times a year the hose should be removed from the truck, examined for mold, and rearranged with the folds in different places.

428. It is most important that sufficient hose be kept on hand at all times to allow for proper testing, overhauling couplings, or the drying of hose after a fire, etc., so that it can be done without having to deplete the amount of hose kept on the truck.†

440.—Nozzles and Couplings

441. Couplings shall be kept in first-class order, and each time after the hose is tested, the threads should be run over with a standard tap and die kept for the purpose. They should be so adjusted that they can easily be screwed up by hand.

442. The rubber coupling washers should also be gone over at this time, and renewed as needed, as they deteriorate and break away. Care must be taken to see that the rubber washers do not project into the waterway, particularly at the nozzle couplings, as this will frequently cause a ragged stream.

443. Bent or battered nozzles or play pipes shall be carefully repaired or else replaced. Bent or battered nozzles should not be used, as the effective reach and fire-extinguishing capacity of the stream will be much impaired. The slightest roughness of the tip will sometimes cause the stream to break or spray and become ineffective.

500.—Organization and Personnel

501. The department should be organized, drilled and maintained with the idea that fires shall be controlled immediately at their start, so far as possible.

502. The ideal fire department should be organized under a constitution, with its own by-laws, and hold regular meetings. The members should be subject to discipline, and acts of unusual merit involving personal risk and endurance should be fittingly rewarded.

503. Membership in the department should of itself confer distinction and should carry with it some privilege sufficiently attractive to make membership desirable. In addition, there should be a club room with a view to encouraging social intercourse through the medium of the fire department organization.

504. The department shall consist of not less than the following:

1 Chief
1 Assistant chief
1 Engineer
7 Privates

505. All members of the department must live in the community, and at least one driver and one motor mechanic should be within 2½ minutes of headquarters.

506. The chief should be, if possible, a man who has had some experience in fire fighting. Failing this, he should be a man with mechanical training. He should also have ability to command men and enjoy their respect and confidence.

507. The assistant chief should have similar qualifications to those required for the chief and be able to take full charge in the chief's absence.

* Twenty minutes will assure sufficient heat to evaporate gasoline left in cylinder and prevent dilution of crank-case oil.

† Products of combustion prove fatal in improperly ventilated structures.

* This is a simple and effective arrangement and does away with the necessity of hoisting the hose. The rack facilitates the proper care of the hose, which will tend to prolong the life of the hose and thus reduce the cost of one perishable part of the equipment. The cut shows a rack in three sections, 3 or 4 ft. wide, and with slatted top so that half a dozen lines of hose may be dried at one time.

† The careful treatment outlined above will very considerably lengthen the life of the hose, and also give assurance that the hose will be in safe and proper condition when needed for fire.

508. The engineer shall have complete charge of the fire pump during its operation, and should acquaint himself with all details of its mechanism.

509. Privates should be men who appreciate the responsibility vested with them and who are willing to serve when called. Their vocation should be such that they can devote time to the necessary drills, meetings, tests of equipment, etc.

600.—Duties

601. The chief shall have full charge at a fire and be responsible for maintenance of the apparatus at all times. He is responsible for the training and drilling of the men and actual testing of all equipment and the department records.

602. Arrangements shall be made for the presence of the assistant chief in the absence of the chief.

603. All members of the private personnel shall be given proper instruction and practice in the duties of a nozzleman.

604. Four members of the private personnel shall be designated and become proficient as drivers.

605. Each driver shall be schooled and examined in the territory to be served by the apparatus as to:

a. Routes and their condition during the different seasons.

b. Locations of water-supplies (wells, streams, lakes, and ponds).

606. At least two members of the private personnel shall qualify and be designated as motor mechanics and it shall be their joint duty to see that the motor is at all times in an operable condition.

607. All members of the department shall be capable of operating and maintaining each piece of fire-fighting equipment in an efficient manner.

608. All members of the department should become proficient in fire prevention inspections and qualify as community school instructors.

609. All members should attend fire drill at the station once each month in summer and two or more times each month in winter for instruction in fire fighting and life saving.*

610. When an alarm is sounded all members of the department shall report immediately at headquarters, unless they have ascertained that the apparatus has already left, in which case they should proceed as rapidly as possible to the scene of the fire.†

700.—Alarms

701. Where practicable, the electric siren is recommended.

702. It should be centrally located and arranged so that it can be controlled from the telephone exchange or similar public place open at all hours of the day and night.

703. Multiple control sirens with switches at several prominent points in the community are desirable.

704. The station house and each member of the department should be provided with a telephone.

705. If the siren cannot be provided, a steam whistle, bell, locomotive tire, or a similar sounding device should be employed for alarm purposes.

800.—Drills

801. Practice drills should always be carried out under strict control, and discipline absolutely maintained.

802. The handling of apparatus should be thorough in every respect and closely approximate actual fire conditions. It should embrace the making of hose connections, stretching hose without kinks, coupling and uncoupling, attaching play pipes, carrying hose up ladders, over roofs and through the interior of buildings, reaching out-of-the-way places, including basements, sub-basements, attics, etc. The men should become practiced in holding the play pipes, also moving and carrying the hose lines while under pressure. It is very important that two men be assigned to handle the play pipe. As a general rule, water should be turned on for all practice work, except during freezing weather. Lined leather mittens should be furnished for handling hose and play pipes in cold weather. At times, when conditions are favorable, a hose line of sufficient length should be stretched to test the maximum working capacity of the pump.

803. At the conclusion of practice drills and on order of the chief, the department should return to quarters with apparatus, and promptly place it in readiness to respond to a fire call. If hose has been wet, it should be thoroughly dried before being placed on the apparatus, and replaced with spare hose during the drying process.

900.—Public Service

901. In addition to their regular duties, the department personnel should become a self-constituted educational force to disseminate the fundamentals of fire prevention as gained from their personal experience in fire fighting and from the publications on the subject, which should at all times be at their disposal.

902. It is recommended that the members of the department regularly inspect the premises in their community in order to locate and secure the correction of all conditions which constitute potential fire hazards.

*In order to educate the officers and firemen and keep them well posted, it is very desirable that one or more magazines dealing with Fire Prevention be subscribed to and supplied the department. "Field Practice," the Hand Book on Fire Protection, published by the National Fire Protection Association, should also be obtained and consulted. Membership in the National Fire Protection Association will supply suitable literature and a complete set of standard rules.

† The apparatus should not be held at the station house more than 3 minutes after an alarm.

Professor Henry V. Hubbard Named First Incumbent of Norton Chair of Regional Planning in New School of City Planning at Harvard

THE degree of Master in City Planning, the first of its kind to be offered by any American university, has been established by Harvard University, and Professor Henry V. Hubbard, of the Faculty of Landscape Architecture, has been named as the first incumbent of the new Charles D. Norton Chair of Regional Planning, and will direct the School of City Planning, it was announced at University Hall on October 21.

Preliminary plans for the location at Harvard of the first graduate school of city planning opened in this country was mentioned in this magazine last month. The chair was founded by the gift of James P. Curtis, of New York City. The Rockefeller Foundation was announced as the donor of a sum large enough to enable the opening of the School.

Professor Hubbard is chief editor of *City Planning*, the official magazine of the profession, and a member of the firm of Olmsted Brothers, landscape architects and city planners. Last year he received a grant from the Harvard Milton Fund for Research to enable him to make a field study of city planning and zoning progress in the United States. The results of this study are just being published in a volume entitled "Our Cities Today and Tomorrow."

Upon learning of the vote of the Corporation, the School of City Planning made public the prescribed curriculum for the School. Many of the courses offered by the School are open to students in the School of Architecture and the School of Landscape Architecture, and certain of the courses are required for the degree in all three schools, to insure that the student may have a broad view of the three fields on graduation. The curriculum during the three years of study for the degree is as follows:

FIRST YEAR

Theory of design with special reference to landscape architecture and city planning
Principles of construction
Horticulture and plant materials in relation to city planning
Historical development and principles of city planning
Elementary drafting
Field methods in preparation of topographic maps
Elementary architectural history, drawing, design, etc.
Freehand drawing
Principles of landscape architecture, illustrated by a critical study of examples
History of medieval, renaissance, and modern art

SECOND YEAR

Practice in city planning design
Principles of construction (second course)
Municipal construction
Municipal planting design
City planning (advanced course)
Freehand drawing
Housing problems and the social aspects of town planning

THIRD YEAR

Practice in city planning design (advanced course)
Professional practice, contracts and specifications
Modeling
Municipal government
Municipal administration
Materials and methods of building construction

A fourth year, not required for the degree, covers a course of special study for competent graduate students.

Diesel-Engine Pumping Equipment Is Both Economical and Reliable

By A. D. COUCH
COMMUNITY WATER SERVICE CO., NEW YORK CITY

MOST engineers are more or less convinced that the diesel engine shows a very high degree of efficiency and economy. To illustrate this point more forcibly and put the matter upon a quantitative basis, an example was chosen illustrating a problem which confronts each of us at times. This is the problem of buying new machinery either to extend present capacity or to replace machinery no longer economical. When this problem presents itself,—as it often does in the Community Water Service Co.,—a comparison is set up between the costs of operating with the existing plant and the calculated costs with other forms of power. About two years ago this comparison was formulated for one of our plants. This plant contained three horizontal tubular boilers of about 125 horsepower each and two horizontal duplex triple-expansion pumps. The equipment had a send-out of 3 million gallons per day, was in very good condition, and was housed in a beautiful building (Fig. 1).

Comparison of Costs

With the thought that the existing economy might be improved, a comparison was made, as shown in Table 1.

These are not merely hypothetical figures, but the actual figures tabulated at the time this study was made—with the exception, of course, of the last column, which could not be arrived at until the diesel plant later installed had been operated. The first column was arrived at by averaging the costs of the last five years of steam operation. You will note that the total operating costs amounted to $29,000 in round figures. The first cost of this plant is not shown, for the reason that a twenty-year-old cost would not be very enlightening today; nor would the same equipment be installed in a new steam plant.

The second column represents an estimate of the operating costs that would be expected if motor-driven centrifugal pumps were installed and power was purchased at 2 cents per kwh., the best rate obtainable. You will note that the yearly operating cost would be in the neighborhood of $28,760, as against $29,000 for the existing steam plant. Clearly, there would be no advantage in making this change. Of course it should be borne in mind that the cost of current may be materially cheaper in some other localities. You might note, however, that power, to beat the final figure in the last column, would have to be bought at approximately 1.1c per kwh.

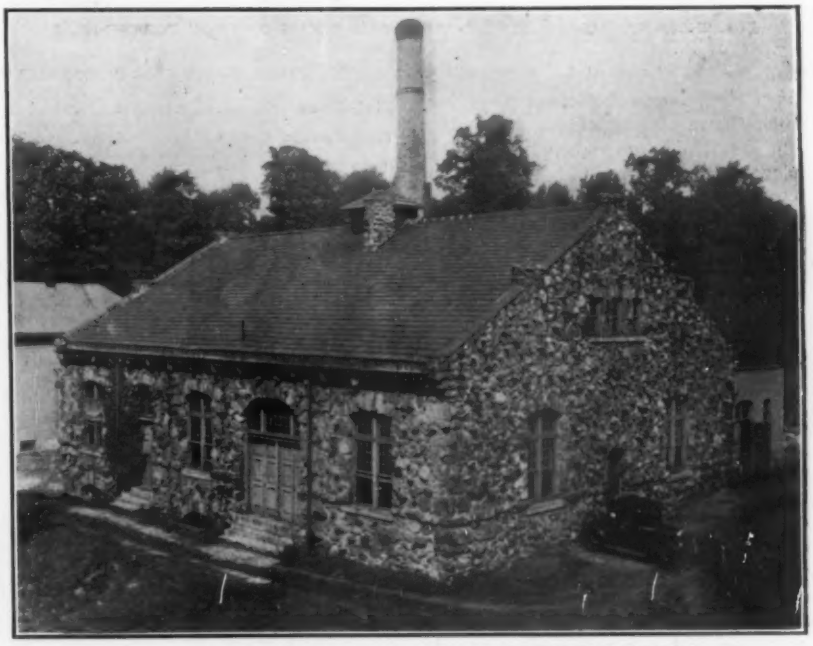


FIG. 1. AN ATTRACTIVE WATER-WORKS PUMPING-STATION

The third column represents an estimate for the diesel installation. This shows a total operating cost—the figure operating men are most interested in—of $16,730, or a saving over the existing steam plant of over $12,000 per year.

On a basis of 15 per cent fixed charges per year, a diesel-engine plant could be justified costing $80,000, retaining the old steam plant for standby purpose only. The price estimated for a diesel installation was $43,500. Actually, the diesel plant cost $43,000 in round figures. Adding 15 per cent of this first cost to the yearly operating cost, a total cost of $23,255 was estimated for the engine plant. This figure compares with $29,825 fixed and operating costs for a motor-driven plant with purchased power. In comparisons of pumping-plants, all figures are reduced to cost per million foot-pounds pumped. On this basis, the electric plant shows fixed charges plus operating costs of $.01343;

TABLE 1—STEAM—ELECTRIC—DIESEL COMPARISON

ITEM	YEARLY COST Steam (Average—five years)	Electric (Estimated)	Diesel (Estimated)	Diesel (Actual)
No. 1 Coal at $3.50	$12,869	$360	$360	$302
No. 2 Power at 2c	.....	22,200	.....	.....
No. 3 Fuel oil at 6.7c	.....	.....	7,350	7,034
No. 4 Lubrication	800	.....	420	496
No. 5 Engine repair	1,000 (Includes boilers and auxiliaries	.....	400	172
No. 6 Pump repair	(Included above)	200	150	.....
No. 7 Labor	13,275	6,000	7,800	5,396
No. 8 Supplies	1,000	.....	250	398
No. 9 Operating total	$28,944	[2]$28,760	[2]$16,730	[2]$13,798
No. 10 First cost[1]		$7,100	$43,500	$43,000
No. 11 Fixed charges—15%	.....	1,065	6,525	6,450
No. 12 Operating + fixed		$29,825	$23,255	$20,248
No. 13 Million gallons	800	800	800	923
No. 14 Average feet head	335	335	335	309
No. 15 Million foot-lbs.	2,220,000	[2]2,220,000	[2]2,220,000	[2]2,462,044
No. 16 Operating cost per m. f. p.	$0.01304	$0.01295	$0.00754	$0.00560
No. 17 Operating + fixed per m. f. p.	.....	$0.01343	$0.01048	$0.00822

[1] Less building. [2] Without auxiliary and light power. [3] With generator included.

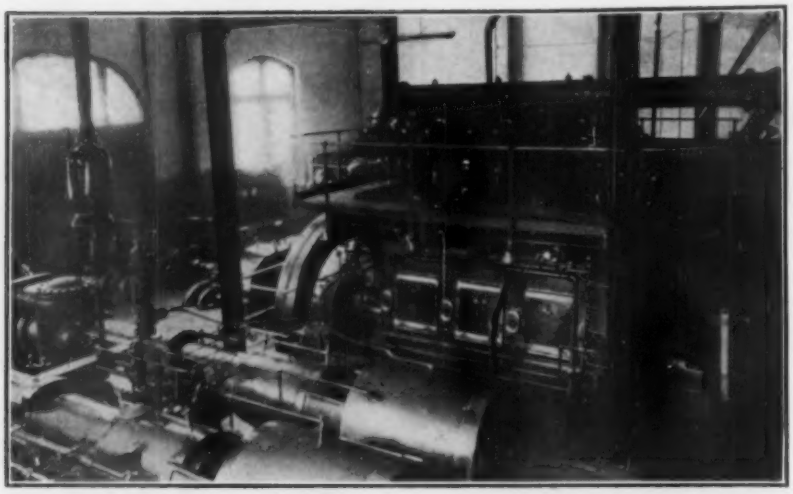


FIG. 2. 338-HP. DIESEL ENGINE, WITH OLD STEAM PUMP IN FOREGROUND

and for the diesel plant, $.01048. No fixed charges for the steam plant have been shown, for reasons already given, but it is readily seen that with the steam plant costing nothing to build, the diesel plant would be the only alternative. It was therefore decided to install a 338-horsepower diesel engine arranged to drive a 3-million-gallon-per-day centrifugal pump through a 400-hp. step-up gear. The complete installation also included a 25-kw. generator, connected to the pump shaft, to generate current for lights, low-lift pumps and other auxiliary power-plant requirements.

The last column of figures represents the actual costs of the diesel installation. These figures cover the first year's operation. You will note that the total operating cost was $13,798, as against the estimated figure of $16,730—a further saving of almost $3,000. This is reflected again in the fixed charges plus operating cost per million foot-pounds which was $.00822. One reason why the total cost was so much lower was that the send-out increased by more than 100 million gallons over the estimated figure.

In order that the writer may be perfectly fair, attention is called to the item "Engine Repairs." An estimated figure is shown of $400 and an actual cost of $172. It is a well-known fact that repairs to a diesel engine increase year by year up to the five-year mark, where the maximum is reached. At this period in the life, considerable maintenance work will be necessary; the engine then should be rendered practically as good as new, when the cost cycle will return to first-year conditions. Therefore, with this in mind, the $400 figure shown in the estimate represents a fair average for this five-year cycle.

The diesel engine is shown in Fig. 2, with one of the old steam pumps in the foreground. It is interesting to note the comparative sizes of engine, gear, centrifugal pump, and generator. The centrifugal pump is so small that it is completely hidden behind an 8-inch column. The instruments on the switchboard include the speed control of the engine; this allows a speed variation sufficient to provide for the whole capacity range at the pressure maintained in the main. A variable-speed motor would be required to give this same flexibility to a motor-driven pump. Even so, the losses ensuing from variable-speed motor control will be considerably greater than is the case with variable-speed diesel operation.

The engine is provided with a lubricating oil separator, which operates continuously. To preserve good lubrication, such a separator is one of the most essential auxiliaries of a diesel plant.

In concluding the description of this station, it may be stated that the duty of this plant as actually found in the guarantee test was 354,400,000 foot-pounds per 100 pounds of fuel consumed, or slightly better than the guaranteed duty of 348,174,500.

Installations containing engines driving centrifugal pumps through step-up gearing are not as uncommon as one might believe. Upon investigation, it is found that a number of these are in regular and satisfactory service.

Costs with Different Drives

The following table shows results obtained in some of the Community Water Service Co. plants using oil engines.

These figures are actually taken from our records for the month of May, 1929. They should serve as a fair example, since this month is neither the lightest nor the heaviest of the year.

TABLE 2—SHOWING ECONOMIES FOR DIFFERENT TYPES OF DRIVES

	Plant No. 1	Plant No. 2	Plant No. 3	Plant No. 4
Kind of plant	Pump geared centrifugal	Pump geared triplex	Elec. gen. and motor	Air lift and triplex
Type of pump: Low lift	None	None	Cent.	Air lift
High lift	Cent.	Triplex	Cent.	Triplex
Pump drive: Low lift	None	None	Elec.	Dir. connected
High lift	Step-up gear	Step-down	Elec.	Belted
No. of engines and hp	1—338	1—40	2—360	1—60
Gallons per day—low lift	.....	.....	1,900,000	125,000
Total head in ft.—low lift	.....	.....	35	100
Gallons per day—high lift	2,880,000	700,000	1,860,000	125,000
Total head in ft.—high lift	307	190	286	248
Mil. ft.-lbs. per 100 lbs. fuel oil	324	264	205	148.6
Operating cost per mil. ft.-lbs.	$0.00515	.....	$0.00723	$0.0242

This table merely shows the difference between different types of drives and the economies.

Plant No. 1 is the same as has been previously described.

Plant No. 2 contains a 40-horsepower engine direct-connected to a triplex pump.

Plant No. 3 has two 360-horsepower engines direct-connected to generators which supply current for operating motor-driven pumps, and plant No. 4 has a 60-horsepower engine direct-connected to an air-compressor which furnishes air to operate the air-lift pumps, and belted

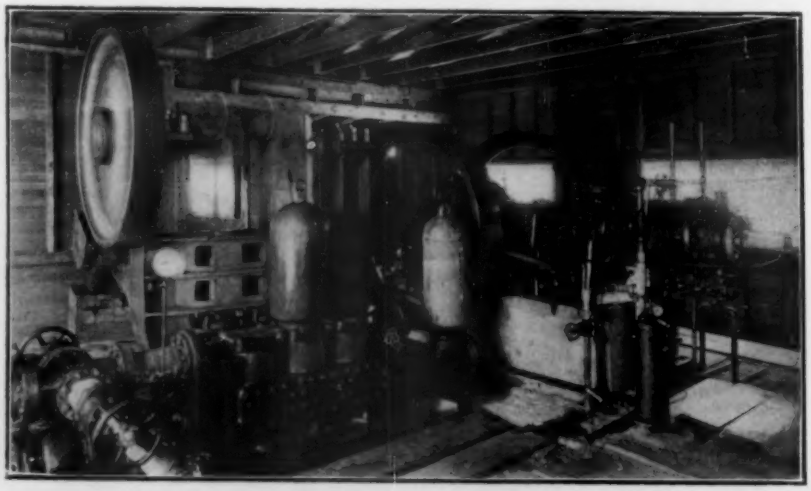


FIG. 3. 40-HP. ENGINE DIRECT-CONNECTED TO TRIPLEX PUMP

to a triplex pump for high-lift pumping.

You will note that the direct gear-driven installations are the most efficient; the air-lift installation is the least efficient.

In Fig. 3 is an interior view of plant No. 2 showing the 40-horsepower engine direct-connected to a triplex pump through a flexible coupling. The triplex pump takes its water direct from wells and has a lift of about 22 feet. This type of installation is probably the lowest in first cost that can be obtained for the smaller plants. Water was badly needed on this property and it became necessary to put the equipment into service before all the "bugs" had been worked out. However, the equipment has been shut down only a few minutes since, for minor adjustments.

Fig. 4 shows the engine and generator room of Plant No. 3, whose figures were shown above.

One more table completes the picture of economy by comparing the costs of steam plants, purchased-power plants and diesel plants. Three good average plants operated by the Community Water Service Co. have been selected, powered by steam, electricity and diesel engine; the diesel plant is the one described earlier in this article.

TABLE 3—AVERAGE OPERATING COST OF STEAM, ELECTRIC AND DIESEL PLANTS

	Steam	Purchased Power	Diesel
Mil. gals. per day	8.17	2.35	2.88
Average head in feet	316	341	Plant No.
Mil. ft.-lbs. per month	669,887	207,485	1
Efficiency wire to water	.....	71.2%	
Coal tons per month	620	.....	.....
Oper. cost per mil. ft.-lbs.	$0.00818	$0.0063	$0.00515

These records also were taken for the month of May, 1929. The steam plant selected contains triple-expansion, Corliss valve pumping-engines and is located where coal can be delivered in the bins for approximately $3.33 per short ton. The purchased-power plant buys current for approximately 1¼c per kwh.

A Matter of Circumstances

It may be said, however, that these figures do not indicate that diesel engines are always the things to install in any station under all conditions. If diesel engines would fit every case, there would be no necessity of setting up any figures in advance. When the Community Water Service Co. investigates any particular situation, it does so with an entirely open mind and without any desire to install any particular kind of equipment. It often appears that equipment of a certain kind is installed which does not exactly fit the case on account of the particular desires and prejudices of the purchaser, and which perhaps excluded the diesel engine when this type of equipment should have been installed.

Those of us who have operated diesel equipment for a number of years do not doubt its reliability; but it is hard to overcome this doubt unless one has actually had the experience. The writer knows this from his own case, for he well remembers what anxiety was felt over the purchase of the first diesel he was expected to operate. This engine was installed in 1914 and is still in operation today. The economy today is no doubt about the same as in 1914.

A Reliable Source of Power

The growth of the diesel engine could not have attained its present height if the reliability in practice did not match up with other types of prime movers. It is significant that diesel engines are found in ice plants, flour mills, paper mills, dredges, railroad locomotives, drainage and irrigation plants, central stations, rock quarries, glass factories, printing establishments, office buildings, hotels, canneries, yachts, tow boats, freighters and liners, not to mention many other recorded industries.

The following is a quotation from C. O. Romig, who manages one of the Community Water Service Co.'s plants containing two 360-horsepower engines. He says in part, "We have come to the conclusion that most diesel-engine troubles can be avoided by inspecting the parts that can fail. An interested engineer rarely needs to be in trouble. We may have more trouble during the next four years than we have had during the past, but to offset this, we know better how to take care of the engines and where to look for trouble." This particular plant has duplicate units—which is the case with all well-designed plants, no matter what the prime movers may be. Since these engines were installed, four years ago, pressure has never been off the mains. There has never been a moment when one or the other of the engines has not been in operation. The success of this plant is largely due to the good care and attention given these engines by Mr. Romig and his operators. Such care is essential in any plant—steam, electric or diesel.

The geared plant described in the first section of this paper has been shut down only once during the past year because of engine failure. The trouble in that instance was due to the failure of a mechanical lubricator serving the air-compressor. A compounded oil was used and this attacked the metal of the lubricator. This sort of trouble had never been encountered before and the operators were not prepared for it. The manufacturer of the lubricator has changed his design to take care of this oil condition and this trouble probably will not occur again.

In conclusion, it may be said that if duplicate diesel-engine equipment is installed in any plant, no complete shutdown should occur if the machinery is given good care and attention, and that the reliability of diesel engines under these conditions will equal that of any steam equipment and will exceed that obtained with purchased power—especially so if the power comes in over long transmission lines, as is the tendency today.

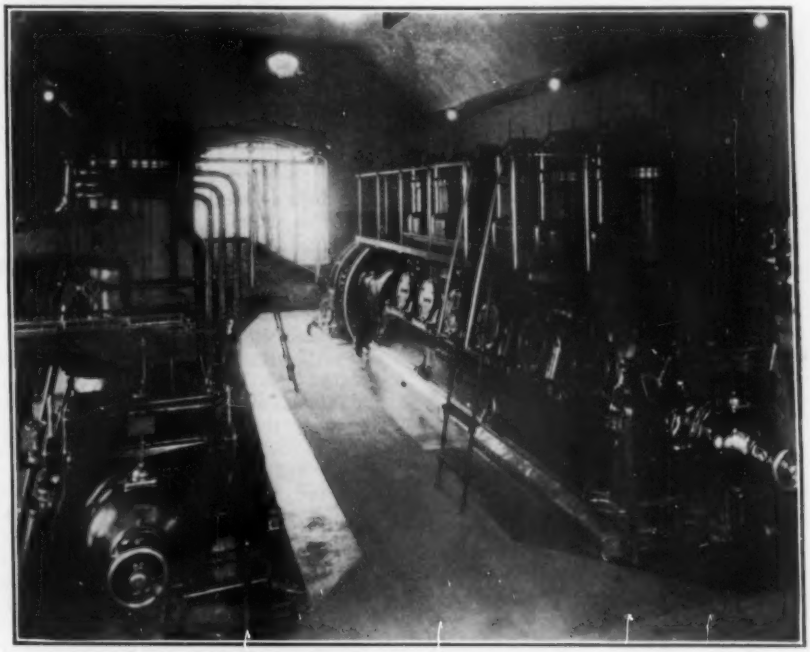


FIG. 4. TWO 360-HP. ENGINES AND GENERATORS FOR MOTOR-DRIVEN PUMPS

ACKNOWLEDGMENT.—From a paper read before the New England Water Works Association.

THE MONTH IN PUBLIC HEALTH

Conducted by JAMES A. TOBEY, Dr. P. H.

Reorganization of the American Public Health Association

A NUMBER of important changes in the organization of the American Public Health Association were voted at the annual meeting held in Minneapolis from September 30 to October 5, 1929. Hereafter this international society of sanitarians will undertake all activities through four standing committees, each of which will have a secretary who will work under the direction of the executive secretary of the Association. These committees are:

a. Fellowship and Membership
b. Meetings and Publications
c. Research and Standards
d. Administrative Practice

The method of governing the Association was also somewhat changed, by vesting control in an Executive Board, comprised of the President, President-elect, and Treasurer as ex-officio members, and six other members, two elected each year, for three-year terms, by the governing council of the Association. The officers elected were Dr. A. J. Chesley, of Minnesota, President; Surgeon-General H. S. Cumming of the United States Public Health Service, President-elect; Louis I. Dublin, Ph.D., Treasurer; Dr. L. I. Harris, Dr. Gordon Bell, Dr. F. E. Harrington, Vice-Presidents; Dr. W. S. Rankin, Chairman of the Executive Board. Homer N. Calver was re-elected Executive Secretary.

Among important resolutions adopted at the meeting was one endorsing a bill introduced in Congress by Senator Reed Smoot, by the terms of which the Federal Food and Drugs Act would be extended to include tobacco within its jurisdiction. Other resolutions were passed favoring greater appropriations to care for the health of Indians and to provide for higher standards and larger salaries for school physicians.

The Association decided to hold its next meeting in Fort Worth, Texas.

A Decoration for Public Health Service

ALTHOUGH numerous medals are available for heroism and distinguished service for military exploits, there is no Congressional decoration which can be awarded for conspicuous gallantry or unusual service in the field of public health. That such a medal is needed and should be established is the contention of an editorial writer in the *Medical Journal and Record* for September 4, 1929.

This is an excellent idea. As the writer well says, "War is a difficult, dangerous, dirty job; equally so is the combat of disease," and he suggests that we ought to make the victories of peace more attractive. Few, if any, of the great scientists, especially the government workers, who have made such notable contributions to the conquest of disease and the promotion of public health, often at personal risk to themselves, have been rewarded by citations or medals, such as regularly go to our military heroes. If our civilian heroes are not forgotten altogether, they are indeed lucky.

By all means should there be a Congressional decoration for distinguished health service.

The Infant Mortality Record

FOR a number of years an annual statistical report on infant mortality has been issued by the American Child Health Association, of which Dr. S. J. Crumbine is General Executive. The report for 1928, prepared under the direction of George T. Palmer, Dr. P. H., has recently been issued and contains much interesting and valuable information Copies of the report may be obtained from the Association at 370 Seventh Avenue, New York City.

For the 719 cities in the Birth Registration Area, the combined infant mortality record for 1928 was 68.3 deaths of infants under one year of age per 1,000 live births. Although this rate was 3.4 points above that of 1927, it is the lowest yet attained except for 1927.

The leading cities with respect to infant mortality in 1928 were as follows, arranged according to population groups:

Population—City	*Rate*
Over 250,000—	
Seattle	43
Portland, Ore.	43
San Francisco	46
100,000 to 250,000—	
Oakland, Calif.	47
Spokane	49
Des Moines	52
Cambridge, Mass.	53
50,000 to 100,000—	
Berkeley, Calif.	31
Union City, N. J.	32
Long Beach, Calif.	38
25,000 to 50,000—	
Alameda, Calif.	25
Medford, Mass.	30
Oak Park, Ill.	31
Everett, Mass.	31
10,000 to 25,000—	
Holland, Mich.	21
Braintree, Mass.	22
Stonington, Conn.	24

It will be noted that all of these cities are in the North. Apparently the leadership in public health attributed to the southern states, as mentioned in a previous item in this department, has not yet been extended to the prevention of infant mortality. In the list of rates by states, the southern occupy places at the end, though Florida ranks 16th. Washington, Idaho, Oregon, North Dakota, Utah, and California are in the first six places. It is interesting to note that in ten of the large cities of the country the infant mortality rate in 1916 was 103, whereas the average for 1928 was only 71. In New York City there has been a drop during this period from 93 to 59, while in Pittsburgh the decline is from 115 to 75 in the space of 13 years.

Who Leads in Public Health?

A GENERATION ago certain northern states were the acknowledged leaders in effective public health work. If a visitor came from abroad to study the best methods and results of our health organization, he went to Massachusetts, New York, and New Jersey, and if he had time, proceeded on to Ohio, and Michigan. Today he turns to the South.

"Leadership in American public health," says an editorial in the *American Journal of Public Health* for September, 1929, "now rests with the southern states. Not only have they made the greatest progress in recent years in the organization of their public health services, but they seem to show more promise in their readiness and ability to extend and perfect their organizations to the point of adequacy. The richer and more complacent northern and eastern areas of the country have much to learn from their sister states below Mason and Dixon's line."

The editorial then goes on describe the evolution of public health programs in the South, pointing out that the keynote of the work was the perfection of local units of rural health service. The plan there was to bring about decentralization of health activities, rather than the perfection of the state health office. In their health activities the southern states have been fortunate in having the cooperation and financail assistance of the International Health Board of the Rockefeller Foundation, as well as special attention from the United States Public Health Service.

"Today, we find in the South," continues this interesting editorial, "a vigorous and growing movement for the completion of health organization, on this tried and proven basis of full-time, competent county health service. There is no part of the country where more vigorous rural health activity can be seen in operation, where money is being spent more wisely, and where better results are obtained than in the South."

This new development is, however, not entirely limited to the South, as the editorial is fair in stating. In Ohio, for example, there is an excellent organization of this character, while Michigan is beginning to come along, and permissive

legislation for county health service has recently been passed in Iowa and Wisconsin. If New York with its traditional efficiency in state health organization would also organize itself on a county-wide health plan, the writer of the editorial believes that a new era in American health work would be ushered in.

The Battle on Cancer

DURING November intensive activities are under way to interest the public in the prevention and cure of cancer. Last year this scourge was second in the list of causes of death in the United States Registration Area, which means that approximately 110,000 people died of the disease in 1928.

Authentic information about cancer can be secured from the American Society for the Control of Cancer, located at 25 West 43d Street, New York City, or from various local cancer committees affiliated with the national society. In New York the city committee of the Society is offering to the public during November a booklet for a shopping list, the sale of which at a dollar each will aid in the financing of the important educational work of the committee.

An excellent statement regarding cancer as a public health problem is given by Dr. James Ewing, of Cornell University, in *Public Health Reports* for August 30, 1929. He calls attention to the fact that in the fight against cancer, Massachusetts seems to be taking the lead, which is at least one function in which a northern state is ahead of the South in public health work. Dr. Ewing recommends special cancer hospitals for the diagnosis and treatment of cancer and suggests that public health officers should assume the lead in getting them established.

The Abatement of Noise

"CITY Noises to Be Abated by Pioneering Committee," is the somewhat sanguine heading of a news release emanating on Oct. 2, 1929, from the office of the Health Commissioner of New York City. The information is then imparted that Commissioner Shirley W. Wynne of this city has inaugurated the first attempt on the part of an American municipality to solve the growing problem of metropolitan noise by appointing a committee of eleven authorities, from the fields of neurology, otology, engineering, building, and law, to consider the matter.

The question of noise, which has received attention in these columns before, continues to interest and excite physicians, sanitarians, and other citizens. Even a dental magazine, *Oral Hygiene*, has an editorial in its October issue pleading for the suppression of unnecessary noises. In supporting this entreaty, many persons would undoubtedly suggest in all seriousness that dentists might make a real contribution to this cause if they would suppress the raucous sounds which seem to be associated with their drilling machines.

In its column entitled "Annotations," the London *Lancet* for September 21, 1929, devotes some space to noise. While decrying the prevalence of clamor and din, this journal points out that the real mischief from noise is not any demonstrable physical effect upon health, but that it may be a serious affliction, to the sick, the nervous, and the wakeful. It is considered questionable whether noise itself can induce nervous troubles, but nervous people have the right to be protected from the unnecessary noises that the ordinary man resents.

"This resentment," continues the writer in the *Lancet*, "may well serve as our standard, for our unsophisticated likes and dislikes are reasonable guides to conduct, and did not, for example, await the progress of science to tell us that butter was a better food than margarine, or fresh air and sunshine healthier than the smoke of the town."

New Jersey Motor-Vehicle Financial-Responsibility Law Effective This Month

ON the 15th of this month there will go into operation an act passed by the New Jersey Legislature of 1929 that will have the effect of a compulsory automobile insurance law. Its broad provisions are stated in the accompanying reproduction of three pages from the "Motor Vehicle Hand Book of Financial Responsibility," issued and copyrighted by the State Chamber of Commerce.

As in the case of a digest published by the State Chamber a year ago when the new traffic act became a law, this four-page folder has been sent to each member. Banks and others may, as then, buy in quantity and distribute gratis.

The value of this service on the part of the Chamber is not only in its own state, in making known, in a few words which anybody can understand, the provisions of a law which may cost its violator both his car registration and his driver's license, but also in spreading encouragement to all those throughout the country who are working for state legislation to compel preventive and compensative measures by motorists.

FINANCIAL RESPONSIBILITY

WHEN REQUIRED

On and after November 15, 1929, all motor vehicle owners and drivers in New Jersey must show their ability to pay for damage caused:

1. If concerned in any motor vehicle accident causing property damage of $100 or more, or resulting in personal injury or death.

2. If convicted of, or upon payment of any sum of money for, violation of Sections 7, 10, 11, 13, 14, or 21 of Chapter 208, P. L. 1921; or Articles 2, 7, 8, 9, 10 or 14 of Chapter 281, P. L. 1928. (See Back Cover.)

PENALTY FOR DEFAULT

Loss of drivers' license.

Loss of registration of all cars owned by law violator or person concerned in accident.

Inability thereafter to secure another driver's license or car registration.

Owner is liable even when vehicle is driven by another.

Appeal from a Court Judgment does not delay application of a penalty.

FORGERY OF EVIDENCE

Of financial responsibility.

Fine $1,000. Imprisonment for 3 years. Or both.

PROOF REQUIRED

Deposit with the Motor Vehicle Commissioner of one of the following:

A. Certificate of possession of a liability insurance policy issued by a company authorized to do business in New Jersey.

B. Bond of a Surety Company.

C. Bond with Individual Surety Owning Real Estate. State Fee $10.

D. Money or Collateral in an amount determined by the Commissioner and held by him to satisfy judgments. State Fee $10.

Upon notice by the Commissioner to Clerk of County where surety's real estate is located, a bond becomes a lien against it in favor of any holder of a judgment arising from a motor vehicle accident.

COVERAGE REQUIRED

Property Damage	$ 1,000
Injury, or death, one person	5,000
Injury, or death, more than one person	10,000

Separate coverage is required for each and every registered motor vehicle.

LAW AFFECTS OPERATORS AND OWNERS

Summary of Law Requirements

Drivers and Owners may be required to show financial responsibility if they violate any of these laws:

CHAP. 208—LAWS OF 1921

Sect. 7. Requires brake, signaling, and lighting equipment; mufflers, mirrors. Regulates use of chains.

Sect. 10. Governs drivers' licenses, examinations, permits.

Sect. 11. Covers manufacturers', dealers', commercial vehicles registration; overloading.

Sect. 13. Covers number-plates; illegal driving.

Sect. 14. Prohibits operating car without owner's consent, racing on roads, leaving car with engine running, driving during suspension, using other's license, allowing unlicensed driver to use car, operating under influence of liquor. Requires reporting accidents.

Sect. 21. Governs operation of commercial motor vehicles, trailers, semi-trailers, tractors.

CHAP. 281—LAWS OF 1928

Art. 2. Regulates action after accident; parking lights.

Art. 7. Driving regulations.

Art. 8. Defines right-of-way, signaling, and restrictions upon overtaking other cars.

Art. 9. Specifies speed limits.

Art. 10. Stop street regulations.

Art. 14. Governs starting, turning, hand signals, stopping.

NOTE. Art. 6. Parking regulations—does not come under provisions of 1929 Law.

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Conducted by A. E. BUCK, *National Institute of Public Administration, New York*

Budgeting in Cities of New York State

THOSE who have followed the development of budgetary methods in municipal governments are aware that there are often wide variations in practice even among cities within the same state. This fact is strikingly brought out by a compilation of the budgetary procedure of 59 of the largest cities in New York State which was recently prepared by the New York State Bureau of Municipal Information.

Less than half the cities listed in this compilation use standard forms in securing the expenditure estimates from the departments. These estimates are filed with various authorities, such as the mayor, city manager, director of the budget, city clerk, comptroller, commissioner of accounts, city chamberlain, board of estimate, finance committee, and common council. They ought, of course, in all cases to be filed directly with the budget-making authority or his staff agency. In several cities the authorities who receive the estimates do not have power to revise them in the course of preparing the budget. Furthermore, they are more or less hampered by not having the assistance of regular budget staffs, except in eight cities.

In a number of New York cities the budget as submitted to the legislative body does not show any comparative information on previous expenditures. Only the requests for appropriations are shown, and these are not in very great detail. Comparative information on revenues is also frequently omitted. Some cities, notably New York, do not even show the anticipated revenues balanced against the estimated expenditures. A document that sets forth only the estimated expenditures without relation to the probable income of the government is not a budget, and it cannot be considered such by any stretch of the imagination.

In fewer than half of the New York cities are public hearings held on the budget while it is in the process of formulation. Where hearings are held, they are usually on the original and unrevised estimates rather than on a tentative budget plan. Criticism can therefore be leveled only at departmental requests, often very much inflated; there are no tentative proposals by the budget-making authority to examine. Hearings at this stage are largely valueless unless they relate to a tentative plan covering both the expenditures and the income of the city government. Indeed, they may be altogether omitted, being conducted more profitably by the legislative body after it receives the budget. In some New York cities it is the practice to have the hearings on the budget held by the legislative body or by one of its committees.

The consideration of the budget by the legislative body is usually confined to a committee of that body. Not all members of the body participate, except in a perfunctory manner at the time of voting the appropriations. If the committee handling the budget does not include all members of the city council, then something like committee-of-the-whole procedure should be adopted in considering the budget. Legislative meetings on the budget should be open to the public, at least to the representatives of the press. It is interesting to note in this connection that the legislative bodies of more than half the New York cities are prohibited from increasing the budget as presented to them; they may only decrease it, and in some cases their action is subject to veto by the mayor.

Generally speaking, the appropriations are made in the same detail as the expenditure requirements are set out in the budget. The result is hundreds or even thousands of items—extensive segregation of appropriations which tends to tie the hands of the administration in carrying out the budget and besides adds greatly to the work of accounting. Transfers are inevitable under this arrangement. The best solution now appears to be lump-sum appropriations with a system of allotments based on a definite work program. To this matter we shall again refer later.

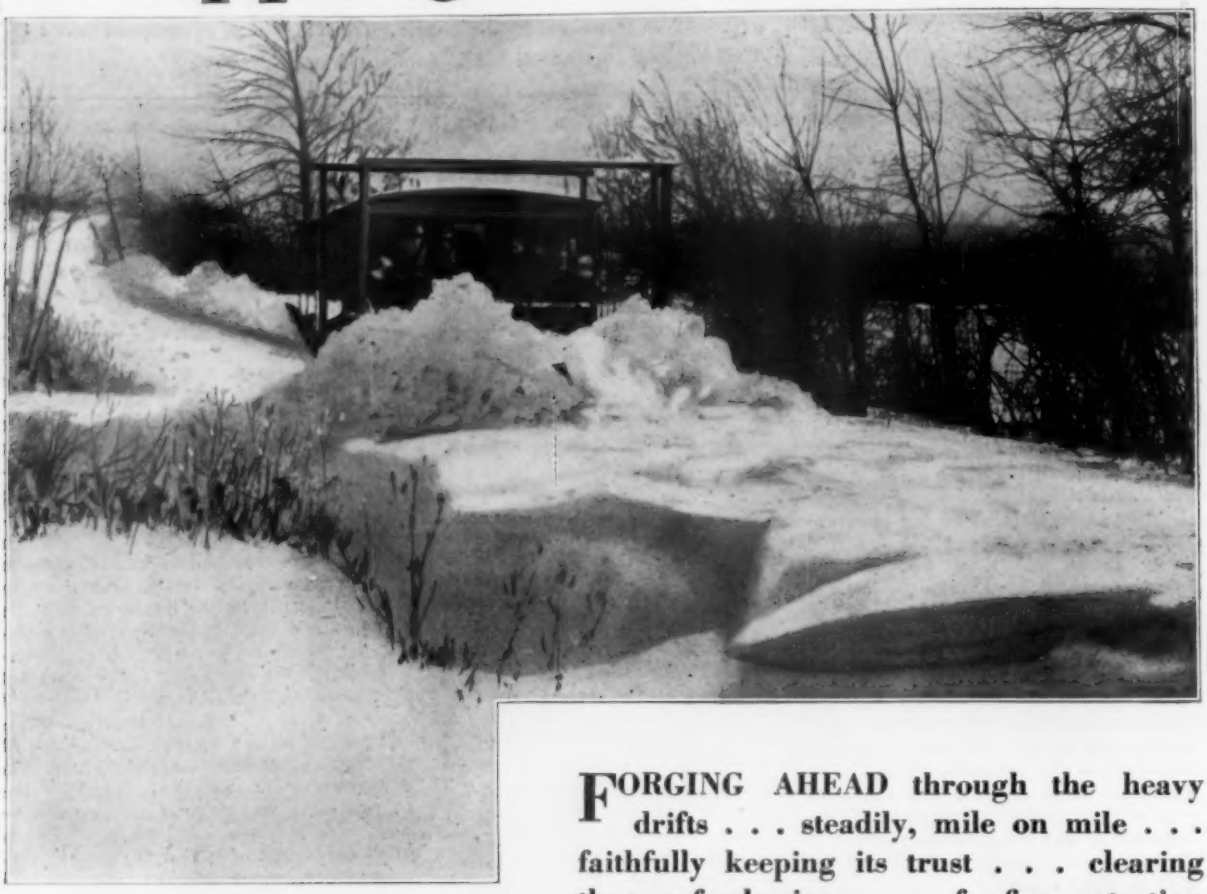
Because of the inelasticity of the whole scheme of appropriations, many New York cities set up contingent appropriations or "funds," as they are frequently called, to meet emergencies. These appropriations are generally under the supervision of the council, although they are sometimes placed under the board of estimate or the chief fiscal officer. In practice they are often used to meet deficiencies in the current appropriations rather than real emergencies. This tends to distort the budget picture, or to warp the budget plan out of line during the fiscal year. And this is not all. The council often has the power to appropriate revenues which may accrue during the fiscal year in excess of the original estimates. This practice permits any surplus to be used during the year instead of being carried over to help finance the budget of the next year.

In several New York cities certain receipts are expended by departments without being appropriated or without even appearing in the budget. Examples of these receipts are the moneys taken in by water-works, parks, and cemeteries. As a matter of fact, few, if any, of the city budgets include all the municipal receipts and expenditures. Special-assessment funds are practically always omitted; so are moneys obtained from the issuance of bonds. The result is that the budget of every New York municipality may be said to be incomplete in that it does not comprehend all the income that the government receives and all the expenditures that it makes.

In the execution of the budget the procedure of New York cities is on the whole extremely weak. No attempt is made in most instances to balance the revenues coming in during the fiscal year with the obligations being incurred or the expenditures being made under the appropriations. If the anticipated revenues do not materialize, a deficit is created by the full expenditure of the authorizations. This deficit is usually met by the issuance of certificates of indebtedness or short-term loans to be financed in the budget of the next succeeding year. Thus the difficulty is pushed over to the next budget, when it should be met in carrying out the current one.

A method of monthly or quarterly adjustment as between income and outgo should be followed, so that under normal conditions the expenditures will not exceed the total income of the government during the budget period. This presupposes that the income will be carefully estimated for each month or quarter of the budget year, which can be done on the basis of past years' collections, and that the expenditures will be made by each department according to a definite work program supported by monthly or quarterly allotments. Expenditure control on the basis of allotments is practically unknown to New York cities, although it is now being successfully employed by several cities in other states. Rochester is perhaps the only city in New York that is attempting to exercise administrative control over the expenditure of appropriations by the use of allotments. The manager of this city has initiated the practice of dividing the appropriations of each department into monthly allotments. This is easily done, since the appropriations are made on the lump-sum basis to each department. Monthly reports on the rate of expenditure are made by the chief fiscal officer to the manager, and likewise quarterly reports are made to the departmental heads.

Whipping the Blizzards



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Detroit's Bonded Debt

THE Detroit Bureau of Governmental Research has recently published an analysis of the bonded debt of that city. This analysis shows that the total gross bonded debt as of June 30, 1929, was $262,604,082.40. After deducting $24,043,673.91 in the sinking-funds at that time, there was left a total net debt of $238,560,408.49. With an estimated population of 1,423,000, this would give the city a per capita net debt of $167.65.

In addition to the bonded debt, the city had, on June 30, 1929, a special assessment net debt of $19,336,303.66. This debt, however, was fully offset by levies made and not yet due on properties benefited by local improvements.

The Detroit Bureau estimates that the city government has acquired through this indebtedness properties worth in excess of $750,000,000. These properties consist of a water-supply worth approximately $90,000,000; sewers, $100,000,000; street railway system, $65,000,000; parks and playgrounds, $100,000,000; street openings and widenings, $40,000,000; lighting system, $20,000,000; schools, $90,000,000; and several smaller items. The Bureau goes on to say that it is astonishing how these huge assets, "so necessary to the city's development, have been acquired so quickly, with a considerable degree of efficiency, and with scarcely an evidence of corruption." It points out that the future needs of Detroit will be even greater than those of the past. For this reason it urges the budgeting of public improvements over long periods of time, a practice which is already being followed in several other American cities.

A New Procedure for Local Improvement Financing in Erie, Pa.

A RECENT bulletin prepared by the Erie County Taxpayers' Association contains an interesting discussion of the practice which has long prevailed in Erie, Pa., in connection with the financing of local improvements, particularly paving and sewers, and the new procedure which has been adopted this year by virtue of an act of the State Legislature. The following excerpts from this bulletin set forth the conditions which existed under the old methods and the advantages of the new procedure:

"It is customary to assess the cost of paving and sewers against the abutting property owners. These assessments are payable in a lump sum or by installments over a period of five years. Contractors performing the work have been paid with bonds, having as security only the benefited property. Payment was made only at the completion of the work and it was necessary for the contractor to finance himself completely during the construction period. These bonds were issued at 6 per cent, and were what is known as callable bonds; that is, the city could call in and pay the principal and interest at any time during the life of the bond. Interest was payable only when the principal was paid. As the property owner paid the installments on the assessments, the bonds were called in for payment.

"The contractor receiving these bonds in payment for work completed had, of necessity, to sell them in order to obtain working capital for further operations. It is asserted on good authority that these bonds brought between 88 and 98 when sold. Thus the contractor actually received in cash but 92 per cent to 98 per cent of his actual bid for the work and no payments were made until final completion and acceptance of the work. The contractor, knowing that he must take a discount on the bonds received in payment, naturally included this cost in his contract price. In addition to his loss by discount, he presumably also calculated the cost of complete financing of the job itself in his estimate of costs. It is therefore fair to assume that any contractor bidding on this type of city work would add not less than 5 per cent to his estimated costs for financing expense.

"These bonds, while theoretically only secured by the benefited property, were in fact assumed by the city when payments were delinquent. The budget for 1929 carried items for $18,389.36 and $5,000 for interest and principal respectively as payment on these bonds to be met by the general revenues of the city. In 1928 a total of over $18,500 was appropriated for the same purpose; in 1927 over $14,000, and in 1926 over $16,000. Simply stated, the city was paying an interest rate of 6 per cent on local improvement bonds because it did not pledge itself to redeem the bonds at maturity, while at the same time morally obligating itself to pay both principal and interest. On general city bonds where the faith and credit of the entire city was security, the rate of interest varied between 4 per cent and 4½ per cent.

"Thus improvements, the cost of which were assessed against abutting or benefited property, carried a high construction cost for the reason that contractors were paid in bonds which had to be discounted to obtain cash, in addition to financing themselves until the acceptance of the work, and also because of a high rate of interest on the bonds themselves. In addition to these two factors, bidding on work was limited to those contractors who were willing to accept bonds in payment for work performed.

"For some years the Superintendent of the Department of Accounts and Finance recognized that the procedure described above resulted in high costs to the property owners abutting on the improvements, but because the councilmanic bonding power was so near its limit, he found it impossible to remedy the situation.

"During the 1929 session of the State Legislature, House Bill No. 800 was introduced. This bill would have changed the status of municipal borrowing for local improvements in that it would have removed all bonds for this type of work beyond any limitation. Incidentally, by such removal it would have perpetuated the old system of high-rate bonds and high-priced contracts. It would have been impossible to sell a full-faith-and-credit city bond under this measure. This bill, fostered by the League of Third Class Cities, was passed by the Legislature, and ultimately vetoed by the Governor.

"The Superintendent of the Department of Accounts and Finance opposed the passage of this bill, and at his request the State Department of Internal Affairs had two alternate bills introduced. Both of these bills had the Governor's approval and were passed by the Legislature. These bills made possible the issuance of full-faith-and-credit bonds to cover the cost of local improvements and allow the finance director to deduct from the statement of bonded indebtedness of the city the estimated amount of assessments to be levied. The city is thus allowed to treat uncollected special assessments as assets on its debt statement. . . .

"Under the provisions of the newly enacted laws, the city is now marketing a 4½ per cent serial coupon bond to pay the cost of local improvements. Interest on these bonds is payable semi-annually and maturities are payable approximately as assessments become due and payable from the benefited property owners.

"The first sale of bonds, for $173,000, under the newly adopted procedure was held in July. These bonds were bought in by the city sinking-fund at a 4½-per-cent interest rate. There were no other bidders. Early in August a second sale was held, for $79,000, and was disposed of to one of the local banks at 4½ per cent.

"On these two issues alone savings in interest to the amount of over $11,000 will accrue to the property owners concerned. In addition to the savings, even greater reductions in costs are evident in the contract prices bid on the work covered by these bonds."

Cincinnati Authorities Report Accomplishments

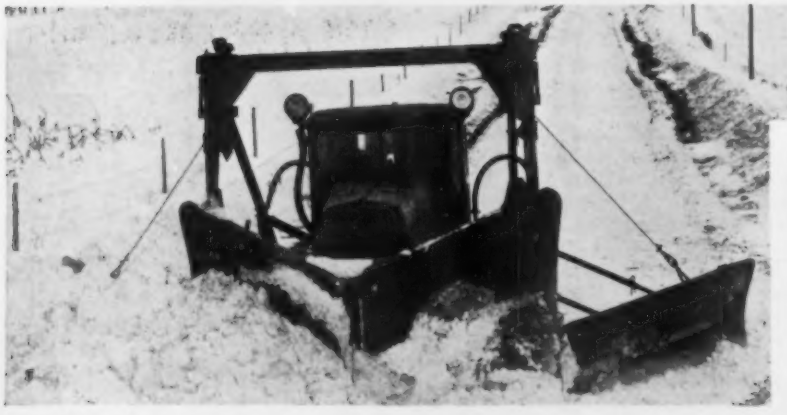
THE authorities of Cincinnati report the accomplishments of the city government during 1928 in a 198-page book entitled "Municipal Activities." An attempt has been made in this book to present the city's work in the most striking manner, illustrations, diagrams, maps, charts, and contrasting type faces being employed to this end. In a large measure the report attains its purpose.

Of particular interest to us is the part of the report dealing with the fiscal end of the city's work. The complete reorganization of the financial procedure of the city is regarded as being one of the major accomplishments of the year. This included the reorganization of the purchasing department. The present system of centralized purchasing is declared to have saved $253,000 during the year, cash discounts on purchases amounting to $14,500. The number of applicants for city positions increased 60 per cent and provisional appointments were reduced from 381 in 1926 to 218 in 1928. The city received $323,801 in interest on its daily balances. The realignment of functions between the auditor and treasurer resulted in a payroll saving of $9,327. A complete change was made in the system

Ruts ruin roads

Prevent them—

with full-width snow-removal



Prices—f. o. b. Peoria, Illinois

TEN . . . $1125 TWENTY . $1975
FIFTEEN . $1500 THIRTY . $2475
SIXTY . . $4300

Caterpillar Tractor Co.

PEORIA, ILLINOIS *and*
SAN LEANDRO, CALIF., U. S. A.

Track-type Tractors Combines Road Machinery
(There is a "Caterpillar" Dealer Near You)

"Caterpillar" Tractors furnish surging power and sure traction for the job.

CATERPILLAR
REG U.S. PAT. OFF.
TRACTOR

Why not remember to mention THE AMERICAN CITY?

of collecting licenses and occupational taxes. The tax for all city purposes, including sinking-fund, was reduced from 10.36 to 9.40 per thousand. There was a decrease in the total bonds outstanding of $172,331.96. The cash balance in the treasury on December 31, 1928, was $7,418,672.25. Finally, the city staged a municipal budget exhibit which was visited by over 70,000 persons.

Payment of Mandamuses in Philadelphia

THE Philadelphia Bureau of Municipal Research is of the opinion that a much-needed improvement in that city's finances is the payment of all mandamuses as soon as they are presented. It is asserted that this procedure would save the city—ultimately the taxpayers—substantial amounts of interest and would also tend to improve the fiscal methods of the government.

A mandamus is defined as "a writ issued by a court directing the city treasurer to pay a specified sum of money to a specified person, firm, corporation, etc., in settlement of a judgment obtained against the city." It is a first lien on the city's unappropriated assets, and as such the treasurer is required to pay the amount of it, together with interest and certain costs, out of whatever unappropriated money he may have in his possession. It seems, however that mandamuses are rarely paid upon their first presentation, but are generally laid over to be paid the following year. This results in a loss to the city, since interest at the rate of 6 per cent a year accrues on each mandamus from the time it is first presented until it is actually paid. This loss in interest is a substantial amount, as the mandamuses issued yearly amount to from two to five million dollars.

The Bureau thinks that the delay in paying mandamuses is the "outgrowth of habit, custom, or thoughtlessness regarding the effects of the practice." It observes further that "deferring payment of mandamuses is a convenient form of borrowing—a kind of forced loan. . . . Forcing claims to be presented via the mandamus route enables the city to spend money beyond its legal limit, and, in the case of mandamuses for land condemnations and other capital outlays, it enables the city to pay considerable amounts of interest out of the proceeds of long-term bonds that should be paid out of taxes." This practice, the Bureau maintains, is contrary to the provisions of the city charter.

It is suggested that the "mandamus evil" be met by including enough money in the annual appropriations to take care of the mandamuses which are likely to occur during the budget year and that the city treasurer then pay each mandamus upon its first presentation.

Belated Financial Reporting

THE city of Toledo, Ohio, published on September 4, as a supplement to the *City Journal*, the financial report of the government for 1928. This report, therefore, appeared more than eight months after the fiscal year had ended. At this belated date, its value would appear to be largely historical; perhaps the administration might use some of the figures in the budget for 1930, but that is all.

Toledo is not alone in producing its annual financial report several months after the fiscal year has ended. Many other municipalities of the country do the same thing. Some are more than a year late. Such reporting does little more than add to the heavy consumption of paper and printer's ink. Annual financial reports should appear immediately—within a month or two at the latest—after the close of the period to which they relate. The accounting methods in every city government should be such that the information for the fiscal period can be expeditiously brought together.

EDITORIAL NOTE.—Readers of this department will be interested to know of the publication of Mr. Buck's "Public Budgeting," which is reviewed at page 177.

Effect of Street Widening on Traffic Flow

A TRAFFIC flow ten times as great as that of 1927 on Olive Street, St. Louis, following the widening of that thoroughfare to 100 feet, was reported by Reyburn Hoffman, City Traffic Engineer of the Missouri metropolis, in an address on October 4 at the National Safety Congress in Chicago.

Introducing his subject, "Reasons and Methods for Making Traffic Counts," Mr. Hoffman said:

"Street traffic is the life-blood of a city. The city's pulse can best be watched by checking periodically the flow of traffic. In what better manner can we reduce congestion and prevent hardening of the arteries than by keeping close check on the movement of this life-blood?

"Because vehicular traffic is fluid and is in large measure a result of habit, it is always susceptible to influences which change its volume, its periods of flow and in many cases its routes. The reconstruction of a street, the widening of a roadway or the elimination of a jog will change completely the habits of thousands of drivers. It is essential, therefore, that the counting of traffic should be a continuous affair, if we are to keep our fingers on the traffic pulse."

The speaker then outlined the traffic survey methods of St. Louis, and illustrated their practical value:

"We had the opportunity to make some interesting before and after counts on Olive Street, which was opened a year ago as a 100-foot thoroughfare with a 76-foot roadway, having been widened from a 60-foot street with a 36-foot roadway with double car tracks.

"The original count of 1927 showed 1,900 vehicles per 11-hour day. At a period when the new car tracks had been laid and paved, there was available a free lane in each direction, and the volume increased to 5,000 per day. After the street was completed, 13,000 vehicles used the street each day, and the most recent check shows around 16,000, or ten times the original flow.

"While making these counts we also checked the adjacent parallel streets, both north and south, leading into the business district, with some interesting results.

"The street most seriously affected was Locust Street. This street showed a decrease of 26.5 per cent. This can be explained by the fact that Locust is connected to Olive via a cut-off one block east of its western terminus, a dead end. Most of the Locust traffic originated at its intersection with Olive, hence, when Olive was opened, the easiest way was to use Olive Street.

"The two adjoining streets to the south showed about 5 per cent decreases, while the third one south remained about uniform. The remainder of the increase in Olive Street comprises additional traffic encouraged by the new thoroughfare, and those vehicles which ordinarily entered from the north or south but which now avail themselves of this new entry into the business district.

"Without discussing these streets in further detail—the object of this is to show the value of making before and after counts.

"Then, too, this information has been used in the timing and regulation of traffic under our new signal system for Olive Street. In this connection we have made counts of cross-traffic volumes, of the time it takes various types of vehicles and also pedestrians to cross this 76-foot roadway. The times for different crossings [signals not yet installed] are as follows:

	Seconds
Pedestrian	14.3
Passenger autos	6.1
Light trucks	6.5
Heavy trucks	9.2
Street cars	10.7

"In another instance we made a special count to see the effects of extending the paving on an important street. This is at the intersection of Twelfth Boulevard and Russell Boulevard. The paving of Twelfth originally ended here, which resulted in both left and right turns which we knew were avoiding the unpaved street. Counts were made before and a year later to the week, during which time the street had been paved. The results are interesting. Traffic increased from 458 to 2,562 vehicles, or 457 per cent. These volumes are not particularly imposing, but the increase unquestionably indicated to us that a proposed cut-off one half-mile south was justified; in fact, that it should be pushed to early completion.

"Similar study counts have been made at other places throughout the city, each one developing valuable facts."

Grandfather Had Long White Whiskers

and the sense to use the best tools he could get.

But the best of grandfather's brooms and shovels couldn't do your job cleaning the streets of snow from curb to curb

The NELSON SNOW LOADER

for High-Speed Snow Removal

does with gas what human labor cannot do
It is the best tool for the job that you can get.

Tread in the old boy's footsteps.
Show as much sense as he did
and at least ask us about it,
what it costs and what it will do.

The N. P. NELSON IRON WORKS, Inc.

822 Bloomfield Avenue **Passaic, N. J.**

it does not pay to shovel by hand when one Nelson

does the work of a hundred men

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Ordinances

HASBROUCK HEIGHTS, N. J.—May, 1929.
MORRIS PLAINS, N. J.—May 28, 1929.
PRINCETON, N. J.—July 16, 1929.
GREENBURGH, N. Y.—July, 1929.
OYSTER BAY, N. Y.—September, 1929.
CLEVELAND, OHIO.—May 6, 1929.
DALLAS, TEXAS.—September, 1929.

Extracting Ore, Rock, etc., in a Residential District

CALIFORNIA.—*Marblehead Land Co. and Standard Oil Co. of California v. City of Los Angeles,* United States District Court for the Southern District of California, Central Division, September 6, 1929. The plaintiffs had heretofore been engaged in extracting oil in the area in question in accordance with an ordinance allowing them so to do. A later ordinance created the area a residential district in which such extraction was forbidden. There was evidence tending to show that the land was worth more for oil than residence. Before the change in ordinance, conditions had changed, making oil extraction in the area more disadvantageous to residential use of it. *Held* that the new ordinance was valid, and the decree should be against the plaintiffs.

CALIFORNIA.—*People v. Hawley,* 279 Pac. 136. An ordinance prohibiting the excavation of rock, sand and gravel in a residential district established by a zoning ordinance is void as an unreasonable restraint on the use by defendant of its property and an unwarranted interference with the right of defendant to carry on a lawful business, in view of the trial court's finding that to permit defendant to continue its excavation operations subject to conditions imposed would not result in any substantial injury to adjoining property or persons residing on or owning such property.

The business of excavating rock and gravel by the owner upon lands belonging to him is a lawful and useful occupation and cannot be prohibited except in cases where the enactment of such legislation may be found necessary for the protection of the legal rights of others.

Approval of Map of Subdivision as a Dedication

CALIFORNIA.—*Wallner v. Barry et al.,* 279 Pac. 148. A city approving a map of a proposed subdivision did not accept dedication of streets shown thereon and thus assume liability for their imperfect construction.

"Filling Station" Includes Necessary Approaches

CONNECTICUT.—*City of New Britain v. Kilbourne,* 147 Atl. 124. Suitable approaches and exits at substantially the level of the street are a part of a gas filling station; and where within three months of the issuance of the permit the permittee had expended $4,500 in covering a brook with a culvert and filling in and grading land to furnish a suitable site for the station and abating unsanitary and unsightly conditions the necessity of which city officials knew at the time the permit was issued and had completed the station within one year, he is protected by the provision in the zoning ordinance that it does not require "any change in the plans, construction or designated use of any building for which a permit shall have heretofore been lawfully and finally issued; provided that construction shall begin within three months from the date of issuance of such permit and that the building be completed in its entirety within one year from the date of the enactment of this ordinance."

Gasoline Stations Within 200 Feet of Church

MARYLAND.—*City of Vincennes, Ind. v. Maryland Refining Co.,* 33 Fed. (2d) 427. A city ordinance prohibiting drive-in gasoline stations within 200 feet of any church or school is invalid because of discrimination in favor of curb stations, to which it does not apply; there being no reasonable basis of classification as between drive-in stations and curb stations.

Board of Appeals—Reopening Decision —New Facts

NEW YORK.—*Matter of Donegan v. Walsh,* Supreme Court, Bronx County, reported in *New York Law Journal* September 20, 1929. The owner of the property in question applied to the Board for a variation of the zoning resolution to permit him in its discretion to locate a six or more car garage in a business district, on the ground of unnecessary hardship. The application was denied. Later a rehearing was granted to allow him to file consents of the owners of 80 per cent or more of the property affected. The permit was thereupon granted upon proof that such consents had been filed. The zoning resolution allows the Board to grant a permit upon such filing. *Held* that the Board had acted properly, these permits constituting new facts.

Excess Condemnation

OHIO.—*City of Cincinnati v. Vester,* Circuit Court of Appeals of the United States, 33 Fed. (2d) 242. Appeal from a decision in the District Court, already reviewed in this department. In the lower court it was found that the purpose of the "excess" condemnation was a resale of the land at a profit, so as to recoup a part of the cost of the principal improvement. The upper court sustains the finding and holds, as did the lower court, that, while so-called excess condemnation for the purposes set forth in the Ohio constitutional amendment may, in a proper case, be valid, that amendment does not authorize excess taking for profit, and such a taking is contrary to the Federal Constitution.

Junk-Yard in Residential District

OHIO.—*Weisbahn v. Kemper,* 167 N. E. 468. The operation of a junk-yard on a large scale in an exclusively residential district, together with the incessant noise and dirt incident thereto, though a lawful business, is a nuisance subject to abatement.

Regulation of Outdoor Advertising in England

An editorial in the *New York Law Journal* of September 14, 1929, gives a quotation from the *Law Journal,* London, of July 13, 1929, reviewing and commenting at length upon the history of the regulation of billboards and other unsightly outdoor advertising in England.

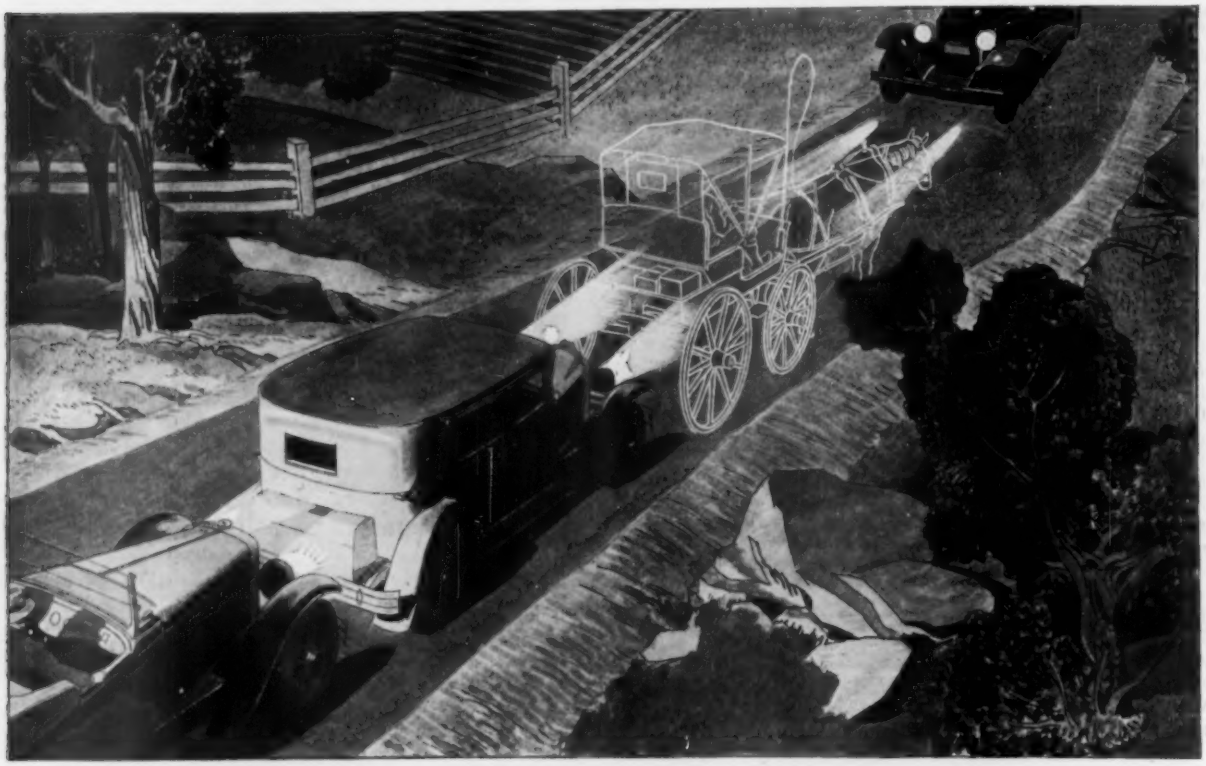
Location of Hospitals

Gordon Whitnall, Director of the City Planning Commission of Los Angeles, Calif., delivered an address on zoning at a meeting of the Association of City Planners of Los Angeles County, September 14, 1929, which is of general interest and value. It calls attention to the fact that zoning is established in principle in this country, and that it is now our task, if it is to prove useful and to continue to be upheld by the courts, to apply that principle intelligently and justly. He illustrates this pertinent statement by comments on the location of hospitals and other humane institutions, and shows how proper regional zoning may reach such results.

Planning Law of New York State

"New York City Planning Law is Getting Results" is the title of an address delivered on September 26, 1929, by George B. Ford of the Technical Advisory Corporation of New York before the New Jersey State League of Municipalities. The choice of the subject would seem to be due to the fact that in all probability a planning law for New Jersey modeled upon the New York law will be introduced at the next session of the New Jersey Legislature, and receive a very considerable support. The New York law is making rapid progress in New York State. Mr. Ford reviews that progress in his address, and predicts an equal success for a similar law in New Jersey.

The next step..Roads *wide* enough



THE hundreds of thousands of miles of busy highways which need widening and rejuvenating constitute America's most pressing highway problem.

Wider pavements are much safer. And much more economical, not only because they accommodate more traffic but also because the traffic is distributed more evenly and wear is lessened. A 40-foot road will have more than twice the capacity of a 20-foot road—3,000 as against 1,400 vehicles per hour.

In any widening or rejuvenating project Tarvia is bound to play an important part. With Tarvia, old narrow roads can easily be transformed into durable, easy-riding, traffic-safe highways with a minimum of inconvenience to the traveling public—and at only a fraction of the cost of new construction.

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THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, *Attorney at Law*

City Held Liable for Injury to Property Caused by Bursting of Water Main.—In the case of Capitol Trust Co. vs. City of Schenectady, 231 N. Y. Supp. 119, the New York Supreme Court for Schenectady County held that the city was liable for flooding of private premises through bursting of a water main. A sewer construction company which had excavated near the place where the break occurred was exonerated as not being at fault. The outstanding parts of the opinion read as follows:

"The right reserved by the city in its contract with the Johnson Corporation [the sewer contractor] to supervise and inspect the work for the purpose of seeing that it conformed to the contract does not, of course, make the municipality responsible for the contractor's negligence. Under the circumstances disclosed here, the contractor was not the servant or agent of the city, even though the latter reserved the right to change, supervise and inspect to the extent necessary to produce the results intended. After a careful review of the evidence, it seems to me that there is no proof . . . that the defendant corporation [the contractor] was negligent in any respect which resulted in the breaking of the main."

As to the city's liability, the opinion says:

"The mere fact that plaintiffs sustained damages by flooding from the city's mains does not alone justify a recovery. A municipal corporation does not insure its citizens against damages from works of its construction. Its obligation and duty in this respect are to be measured by the exercise of reasonable care and vigilance. Liability can only be predicated upon its neglect or misconduct. Here, however, the plaintiffs have been damaged without any fault on their part, and it is unquestionably a difficult thing for them to furnish evidence as to the precise cause of the break, and consequently they are entitled to the most favorable inferences which are fairly deducible from the testimony given in their behalf. It is common knowledge that city water mains do not break, if properly constructed, unless for some exceptional cause which may or may not be attributable to negligence. . . . It may be that in this instance several concurring causes produced the result.

"Here, the evidence is meager and it is not an easy matter to say just what caused the rupture. . . . The Y varied in thickness from ¾ of an inch to 1⅛ inches, and the initial point of the fracture was at the thinnest place in the pipe where the connection of the casting only equalled 1½ bells. This variation, generally speaking, is more than is found in a standard casting. As a result the casting was deficient in strength in several particulars. It is also quite obvious that this main was subjected to considerably more pressure than was originally contemplated. The evidence also shows that the Y connection was improperly and carelessly supported. When the excavation was made it was apparent that the pipe was leaky and defective and the city had ample notice thereof. It failed to remedy this condition, although it made several vain attempts to do so. It seems to me that it is not an unreasonable inference that the city's employees were also negligent in the manner in which they attempted to caulk the joint."

Indexes to Legal Decisions

The items appearing in this Department each month are classified by subjects in THE MUNICIPAL INDEX. The 1928 edition of the INDEX, on pages 110 to 115, covers the legal items published during 1924 to 1927 inclusive, and pages 94 to 97 of the 1929 INDEX list the items for last year.

Road Culverts Installed Not Subject to Replevy Although Not Paid For.—Defendant county contracted for road culverts, in violation of a constitutional prohibition against becoming indebted beyond current revenues. Being unable to collect the price, the culvert company sued to replevy the culverts, but lost the suit. The Arkansas Supreme Court said (Dixie Culvert Manufacturing Co. vs. Perry, 12 S. W. 2d, 10):

"It affirmatively appears that the culverts have been placed in the roads of the county and have become a part thereof. They have therefore ceased to be personal property, and an action in replevin will not lie for their possession."

Concerning the constitutional provision, the opinion has to say:

"This amendment imposes upon one who makes a contract with a county, city, or incorporated town the penalty of losing the value of the article sold in violation of its inhibitions, and imposes upon any officer who issues a warrant or certificate of indebtedness in violation of its inhibitions a heavy fine, with the penalty of loss of office. No right to recover the culverts could, therefore, be asserted if they had not ceased to be personal property, because a violation of this constitutional amendment must be shown in the assertion of that right."

County Held Not to Have Preferred Claim Against Insolvent Bank.—In the case of City National Bank vs. Eastland County, 12 S. W. 2d, 662, decided by the Texas Court of Civil Appeals, question was raised, among other questions, whether the county had a preferred claim against an insolvent bank. The county contended that the contract under which its deposits were made in the bank impressed a trust character upon the funds. But the Court of Civil Appeals said:

"This presents the question of whether the obligation of the bank was literally to keep in hand at all times sufficient cash to pay the county the full amount of its deposit. The particular condition of the bond, upon which it is claimed that this duty rested upon the bank, reads as follows: 'That all funds of the county shall be faithfully kept by said depository and accounted for according to law.'

"This condition must be construed in the light of the intent of the parties and the purpose of the depository contract. Were the contract one of bailment, this theory might be upheld, but, since the contract was one for bank deposits, the relation between the parties created by the transactions was that of debtor and creditor. The money, when deposited, became the property of the bank, and its obligation to pay interest to the depository on daily balances negatives, within itself, any obligation to keep the funds of the depositor on hand in actual cash at all times. To hold otherwise would deprive counties from procuring interest on their funds and bring about a condition necessitating their paying depositories for their services in safe-keeping the funds as bailees or trustees. Liability cannot be predicated against the bank and its corporate sureties on this theory."

Legal Newspaper Held Qualified to Publish Ordinances, as Being a "Newspaper"—Provision for Recording Ordinances Not Mandatory.—A daily periodical devoted to court news, legal notices and proceedings, etc., is a "newspaper," within the meaning of a charter requirement for publishing ordinances in a daily newspaper, according to the view adopted by the Michigan Supreme Court in the case of Red Star Motor Drivers' Association vs. City of Detroit, 221 N. W. 622.

In the same case it was decided that if the charter of defendant city provided for recording of ordinances by the clerk, the provision was directory and not mandatory; hence, non-compliance would not be fatal to the validity of an ordinance.

Master Construction Glass-Overs for Sludge Beds

Glassing over the Sprinkling Filters is a comparatively recent development. This one, of Lord & Burnham Master Construction, located at Totowa, N. J., is accredited with being among the first

Decreasing Odors And Increasing Drying Efficiency of Sludge Beds and Sprinkling Filters

BY glassing over Sludge Beds and Sprinkling Filters, a perfect control of odor release is made possible. Odors that are highly objectionable when released as rapidly as developed, are rendered inoffensive when released under proper control as to time and amount. In this way, a most objectionable feature of a sewage disposal plant, is minimized.

In the case of sludge drying beds, a greater drying efficiency is also secured, the average outdoor drying in the vicinity of New York City, being around seven dryings per season. In some of our Glass-Overs, this has been raised from 14 to 25 dryings, 20 being a generally accepted average.

The Plant illustrated is at Totowa, N. J., and is a particularly interesting one in that it has two Glass-Overs, one of which houses a sprinkling filter, and one the sludge bed.

Glad to send you full particulars as furnished to us by Mr. Chas. H. Capin, Jr., who is the Sanitary Engineer in charge.

Lord & Burnham Co.

Sludge Bed Glass-Overs

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Branch Offices: Boston, Philadelphia, Irvington, Denver, Detroit, Cleveland, Buffalo, Greensboro, St. Louis, Montreal, St. Catharines.

City Held Not Liable for Sewer Contractor's Failure to Safeguard Private Property Against Subsidence.—Where subsidence of parts of lots adjacent to a street was caused by failure of a sewer contractor to erect proper braces, as required by specifications, and not through inherent fault of the city's plan for a sewer, the city was not liable, held the California District Court of Appeal in the case of Kaufman vs. Tomich, 272 Pac. 1082. The Court said:

"I think the damage to plaintiff's property was caused by the negligence of the contractor in failing to carry out faithfully the specifications and not by the public work as planned, specified and contemplated. It could have been executed without harm to plaintiff, if proper care was used by the contractor; and so it was not to public work, but the manner of executing that public work by the contractor, which damaged the plaintiff. Although the specifications called for bracing, yet, quoting from respondent's brief, 'it clearly appears that no bracing or protection of plaintiff's wall was taken until after the damage had occurred.' In the authorities relied upon by respondent for upholding the liability of the municipality, the damage resulted from the very nature of the improvement as planned. . . .

"The public work planned and ordered was to open and close the street, again restoring it to its former state in good order. The work as planned, then, would do no harm to plaintiff; but the city is held liable by the judgment, because the work as located and aligned was inherently dangerous—inherently wrong and of such a nature as was likely to damage and injure plaintiff's property. If the judgment is correct, then the municipality is responsible at all events for damages caused by the contractor if the work planned is dangerous, but not if the work is not dangerous inherently. No such distinction has been drawn in the authorities between dangerous work and safe work. The amount of danger only determines the amount of care required in executing the work."

A City Held Not Empowered to Award a Contract to a Lowest-Bidder Corporation of Another State Not Licensed Locally.—In the case of Flinn vs. Gillen, 10 S. W. 2d, 923, the Missouri Supreme Court adjudged to be void tax bills issued by the city of Excelsior Springs for street paving, on the sole ground that the contractor to which they were issued was a non-resident corporation that had not complied with the conditions under which the laws of Missouri permit such corporations to engage in local business. And it was decided that plaintiff, as assignee of the tax bills, could claim no better rights than the contractor, although the assignment was taken without knowledge that the company had not secured the necessary permit to do business in Missouri. Part of the long opinion of the Supreme Court reads:

"If this argument [plaintiff's unsuccessful contention] be given its necessary and ultimate effect, it means that if a foreign corporation, not licensed to do business in this state, is found to be the lowest bidder for the construction of a public improvement and also the best bidder in the sense of resources and facilities for performance of the work to be done, then the duty is laid upon the city council of awarding the contract to such foreign corporation, although it is without legal authority to transact the business involved in the construction of the improvement called for by the contract. . . .

"Allied to the foregoing is the further contention that the statutory requirements, to be complied with by the foreign corporation as a condition precedent to its right and authority to do business in the state, do not apply to contracts made by the state or by one of its governmental agencies. The ultimate and necessary effect of this argument would be that, because the city is a governmental agency, it may, in entering into a contract with a foreign corporation, disregard the question whether such corporation has been authorized by the state to do the business of the kind contemplated, and it would follow, on the same ground, that such foreign corporation, because its contract is made with a municipality, and the business to be done thereunder is for a municipality, for that reason, is not required to comply with the statutory requirements, in order that its contract may be valid and enforceable."

Property Owner Held to Have Prematurely Complained Against a Paving Contract.—An opinion of the Texas Court of Civil Appeals draws a vital distinction between the right of a court to cancel an ordinance and to enjoin enforcement of a void ordinance, and between the right of a taxpayer to compel cancellation of a paving contract and to enjoin issuance of tax certificates against his property under such contract. (Tabb vs. City of Mt. Pleasant, 12 S. W. 2d, 831.)

Plaintiff sued to annul paving ordinances and a paving contract, but the court held that the suit was properly dismissed for the following stated reasons:

"We do not think the court below erred when he refused to render judgment annulling the ordinances on the ground that they constituted a cloud on appellant's title to the land he owned . . . abutting on one of the streets. A court in a proper case has a right to treat an ordinance by a city or town as void and to enjoin the enforcement thereof, but it is without power to cancel such an ordinance. . . . In this case, if the ordinances were invalid so far as they purported to affect appellant's right, the fact might have furnished a sufficient ground for enjoining the issuance against him of the certificate covering a part of the cost of the paving, and for enjoining the issuance of the warrants provided for in the ordinances, but this suit was not for that kind of relief. His petition contained a prayer for general relief, but did not contain a prayer for relief by injunction. It is held that in the absence of such a prayer a plaintiff is not entitled to such relief. . . .

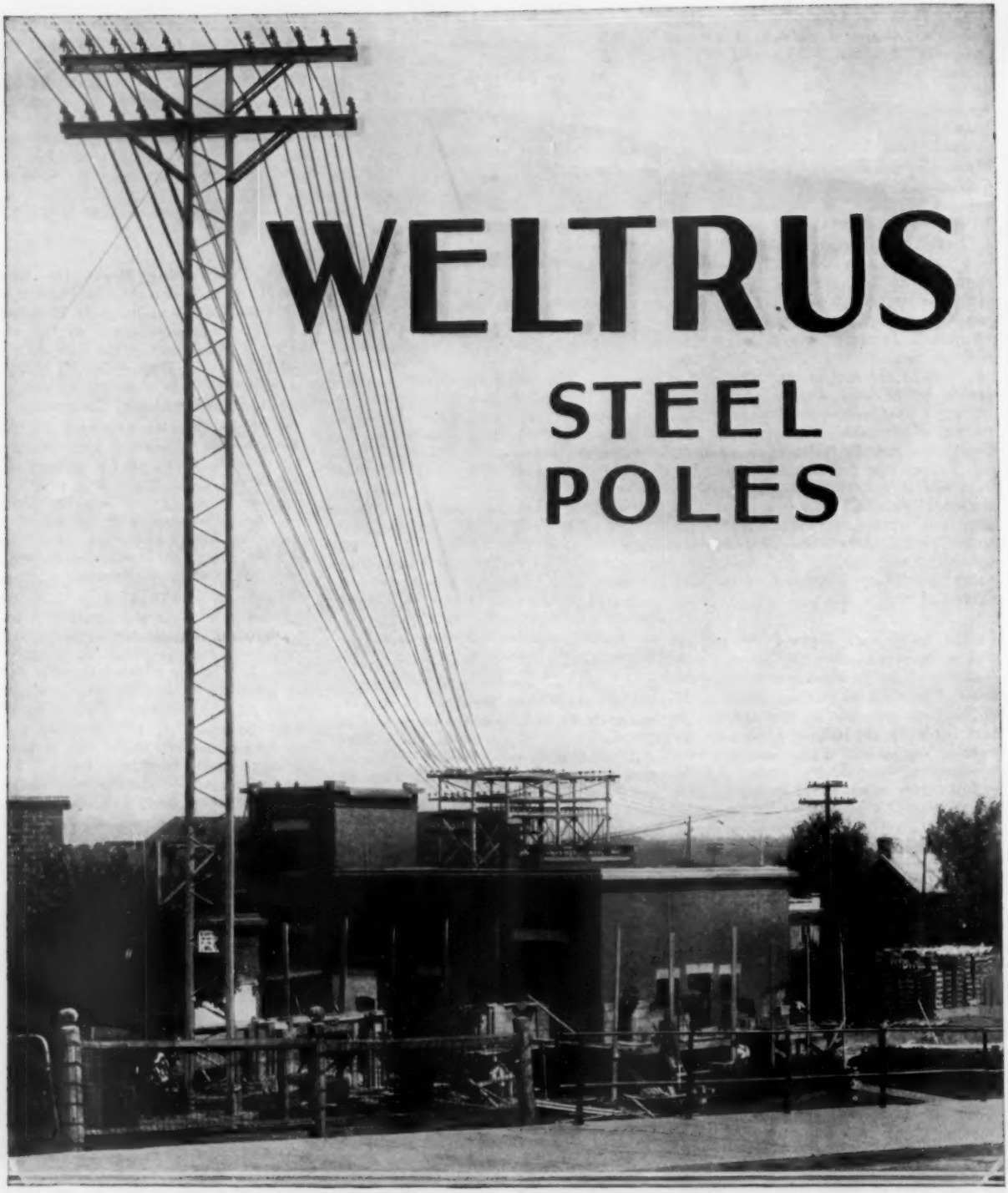
"Nor do we think the court below erred when he refused to cancel and annul the contract between the city and Crigler. The mere existence of that contract did not affect any right possessed by appellant. The contract can never affect any right of his unless and until either the certificate to be issued against him, hereinbefore referred to, or one or more of the warrants provided for, has been in fact issued. If neither is ever issued no right of his will be prejudiced."

City Constructing Drain for Sole Benefit of Assessed Lands Held Not Liable for Failing to Properly Maintain It.—The question presented to the Indiana Appellate Court in the case of City of Logansport vs. Cotner, 163 N. E. 277, and that tribunal's decision, appear in the following extract from the opinion:

"The main question presented by the record invites decision of the question whether cities and towns in Indiana are obligated to keep drains in repair and free from obstruction, where the same have been constructed under the authority of the municipality exclusively as surface water drains, and not constructed for public sewers for sanitary purposes.

"It is to be kept in mind . . . that the drain in question was constructed for the purpose of draining surface water, that it was paid for exclusively by property owners, beneficially affected thereby, and that appellant [the city] paid no part thereof for the benefit of the public. It simply exercised its governmental and discretionary powers under the statute, and, on the petition of those whose lands were to be benefited thereby, constructed the surface water drain, and when, in the further exercise of its governmental power, it heard the question of benefits and damages growing out of such construction, and fixed the amount of the same, it had completely performed the duties which it had assumed. It was not compelled to exercise such powers, nor was it compelled to continue the exercise thereof by supervising the operation of the drain. In Finley v. City of Kendallville; 45 Ind. App. 430, 90 N. E. 1036, this court, speaking by Myers, C. J., now of the Supreme Court, held that the exercise of a city's power to establish a drain for carrying off surface water was discretionary, and the right to abolish or discontinue the maintenance thereof must also be regarded as discretionary, where, by so doing, the adjoining proprietor was left in no worse condition than before the construction of the drain."

Basket-ball Suits Held Not "School Supplies," for Which Municipal Funds Might Be Expended.—A Massachusetts statute authorized defendant city to expend municipal funds for "school supplies" to be lent to public school pupils, and for equipment for play and games on the school grounds. In the case of Brine vs. City of Cambridge, 164 N. E. 619, the Massachusetts Supreme Judicial Court decided that these statutes did not authorize purchase of basket-ball uniforms to be lent to players on school teams.



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Public Budgeting.—By A. E. Buck, National Institute of Public Administration. Harper & Bros., New York. 1929. 612 pp. $6.00.

During the comparatively recent development of the budget system in the United States, various books dealing to some extent with budgets have appeared, with several of which the author of the current volume has been concerned; but this is the most comprehensive and generally useful, and Mr. Buck's extensive and intimate acquaintance with the subject, in detailed application as well as in general theory, and his proven ability in its presentation and interpretation, make him the appropriate author *par excellence*. The book deals not only with the history and philosophy of public budgets—national, state and local—and the manner of their preparation, but also with their execution, going into the matters of organization and procedure for this purpose.

Furthermore, it is not merely a recounting of past development and present practice; the merits of the various methods are weighed, possible future trends are critically discussed, and what is deemed to be the best manner of handling the problems of budgeting, in the light of the author's broad knowledge, is presented in sufficient detail to make the book a valuable advisory handbook for administrators —municipal and county as well as state and national.

1929 Supplement, an Analysis of Population Data by Census Tracts with Location Index, Cleveland and Vicinity.—With the original Analysis, as prepared and published by Howard Whipple Green, A.B., B.S., Chief of Statistics and Research, and Secretary of the Cleveland Health Council, in 1927. Maps. 16 pp. quarto, paper-bound, and 53 pp. cloth-bound, $10. Special discounts to educators and social agencies.

"The cities of the country having an adequate fact basis for thinking and planning about population problems can be counted on the thumbs of two hands," says Leonard P. Ayres, in a foreword to the Analysis volume, adding that among the great cities, New York alone for several years knew where New Yorkers lived, and how rapidly they moved from place to place, until Mr. Green made similar valuable information available about Cleveland. What Mr. Green has done, specifically, is to divide the entire area of Greater Cleveland into tracts of about 160 acres each, record the exact boundaries, and populations as of 1910 and 1920, and estimated populations as of 1928. He thus provides permanent population-unit areas for use of the United States Bureau of the Census in its ten-year enumerations. The studies in published form, giving all basic data concerning each tract, afford an extremely useful basis for community studies of all kinds. Mr. Green points to the advantages of the analysis of vital statistics by census tracts. It is also suggested that municipal government, especially in the field of public health, will find the units valuable in the establishment of administrative areas; and that private as well as public social and relief agencies may make important use of them in arranging field service use districts.

Columbus, Ohio, the Gateway City; Monthly Industrial Review.—Two publications issued by the Industrial Bureau of Columbus. The first is an attractive 30-page illustrated booklet descriptive of the economic development and the "human development" of a progressive present-day municipality of 322,000 inhabitants, and showing it as a great air capital. *The Monthly Industrial Review.* (16 pp., multigraphed) is a membership circulation bulletin containing in each number researches into the character of the city's development. "The Columbus Trade Balance" in the September issue is typical. (Apply to the Bureau.)

Electric Street Lighting.—By Charles J. Stahl, E.E. John Wiley & Sons, New York. 1929. 228 pp. $3.50.

Textbooks and treatises on illuminating engineering have appeared, and many articles on different aspects of that broad subject are continually being published in various technical journals, but this is the first treatment in book form of electric street lighting in a fairly comprehensive way. The author, who is manager of the Illuminating Engineering Bureau of the Westinghouse Electric & Manufacturing Co., at South Bend, Ind., has through this connection and various other contacts obtained a wide acquaintance with practical street-lighting problems. Although the book is not ultra-technical it is by no means restricted to the obvious and mechanical side of street-lighting practice but goes into the many factors and relationships of the subject, including some treatment of the physiological basis, photometric principles and methods, the objects to be attained in light redistribution and ways of doing so, and many practical matters relating to available equipment and its adaptability to conditions met with in our cities. The book is well illustrated by photographs, diagrams, maps, etc. It serves a very useful purpose for city officials and employees concerned with this important and growing subject. The initial chapter of the book, on the history of street lighting, appears in this issue of THE AMERICAN CITY, at page 108.

1929 Supplement to Book of A.S.T.M. Standards.—This is the second supplement to the 1927 edition of the triennial Book of American Society for Testing Materials Standards. It supplements both Part I, Metals, and Part II, Non-Metals, which were presented separately. The Supplement can also be divided into two parts likewise. It contains 19 revised and 32 newly adopted standards approved by letter ballot of the Society, September 23, 1929. 293 pp. $1.50. (Apply to the Society, 1315 Spruce St., Philadelphia, Pa.)

The Public Library in the United States.—By Arthur E. Bostwick. A pleasant and extremely readable account of public library development and the functions of the public library, educational and human, is published by the American Library Association, Chicago, Ill., in the form of a cloth-bound, illustrated volume of 62 pages. (Apply to the Association.)

A Survey of Recreation Facilities, Rochester, N. Y.—At the request of the Council of Social Agencies of Rochester, Charles B. Raitt, recreation specialist, acting for the Rochester Bureau of Municipal Research, has submitted this voluminous report of 410 pages. It is developed along three general lines, starting with the assumption that public recreation is closely related to public health and general welfare, and is therefore a community responsibility: (1) what can be accomplished immediately at little or no cost; (2) what can be accomplished in the next five years through use of unused city property, by minor acquisitions, increased personnel, and more intensive program development; and (3) what can be accomplished in the next 15 to 25 years. $2.00. (Apply to Council of Social Agencies.)

Fire Prevention and Fire Protection Literature.—The National Fire Protection Association has issued an Index of 28 pages, paper-bound, listing its publications now available on fire prevention and fire protection subjects; also subjects covered in the "Printed Records," September 30, 1926, to September 30, 1929. (Apply to the Association, 60 Batterymarch St., Boston, Mass.)

Proceedings, Conference on Highway Engineering (Michigan).—This booklet of 218 pages records the proceedings of the fifteenth of a series of annual conferences held under the direction of the College of Engineering, University of Michigan, with the cooperation of the Michigan State Highway Department and the Michigan Association of Road Commissioners and Engineers. The meetings were at the University, February 20-23, 1929, and the booklet is an official publication of the University, Vol. XXXI, No. 14, dated August 24, 1929. Topics of the sixteen papers reported include the part of highways in the national transportation system; highways of Ontario and of the Chicago metropolitan area; the enforcement of material specifications; concrete paving mixtures; correlation of soil and pavement surveys; bituminous retread for macadam roads; county road maintenance, organization and costs; roadside development; small bridge and culvert problems; developments in the township road situation; the use of automatic signals at light-traffic intersections; railroad crossing protection; and airports. (Apply to the University, Ann Arbor, Mich.)

Proceedings, New Jersey Sewage Works Association.—The fourteenth annual meeting of this association was held in Trenton, N. J., March 22-23, 1929. The Proceedings, a booklet of 84 pages, includes papers on the relation of sewage-treatment plant operation to the propagation of mosquitoes; the effect of and responsibility for the inspection of connections on line maintenance and plant operation; the relation between the operator, the state health department and the municipality in New Jersey, and in North Carolina; uniform reports of sewage works operation in Ohio; activated sludge by mechanical aeration; second-year operation of plants at Newcastle, Pa., and Trenton, N. J.; the effect of iron compounds; odor control; experience with sewage pumps at Morristown, N. J.; the efficiency of sedimentation tanks at Syracuse, N. Y.; public health aspects of the trade waste problem; and counting enzymes during digestion of properly seeded sludge. (Apply to the Association, John R. Downs, Secretary, Bound Brook, N. J.)

Annual Report of Ohio Conference on Water Purification.—The 1928 Conference, held at Lima, Ohio, November 1 and 2, 1928, under the auspices of the State Department of Health, is reported in this 80-page booklet, which includes abstracts from original papers and discussions; the full text of the papers, with illustrations, is given in appendices. They include descriptions of water purification plants at Lima and Wellston; the proposed re-sanding of the Cincinnati filters; two papers on water softening; one on the bactericidal action of lime; and three papers on the treatment or prevention of phenolic contamination. There are also some brief accounts of miscellaneous plant problems, with discussion thereof. 1929. (Apply to State Department of Health, Columbus, Ohio.)

Universal Safety Series.—"Twelve addresses by distinguished leaders in the business, political, scientific, and educational life of the Nation, as presented over the radio in the National Safety Campaign conducted by the National Broadcasting Company in cooperation with the National Safety Council, 1929." Prominent among the addresses are: "Safety as a National Problem," by Hon. Robert P. Lamont, Secretary of Commerce; "Education—The Part It Plays in Safety," by Dr. John Finley; "Making Our Highways Safe," by Dr. Miller McClintock; and "Death Through Accident," by Albert W. Whitney. 63 pp. (Apply to National Safety Council, 108 E. Ohio St., Chicago, Ill.)

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What About the Year 2000?—Prepared under direction of Joint Committee on Bases of Sound Land Policy, organized by the Federated Societies on Planning and Parks. Federated Societies on Planning and Parks, Washington, D. C. 1929. 168 pp. $1.00.

Land consciousness in America was formerly an awareness of the wilderness as menace and barrier to advancing civilization. But here is tangible evidence of a new land consciousness which seeks to substitute a national policy of intelligently directed utilization of all land for the present haphazard development and use. The Committee undertook, three years ago, an inventory at Federal sources of all available information on major land resources, and a tentative forecast, based upon this information, of the uses of such resources for the predicable populations of 1950 and of 2000. The findings and studies are here summarized under the general heads of "Populations," and "Land Resources"; and under the separate heads: "Urban Land Uses"; "Public, Scenic, and Recreational Areas"; and "Agricultural Uses." The Committee is able through its studies to silence the alarms of those who have foreseen a great land shortage and a country denuded by overpopulation and to answer such questions as "Where will the people of the future live?" and "How shall we settle conflicting demands for land and water uses?" It is able to offer some conclusions which it believes may be safely accepted as a basis for forming land policies in certain fields. It puts forward the summary, however, as being, in general, exploratory, and as merely leading the way for more exhaustive and consecutive studies on which a comprehensive land planning program may advisedly be based. The Committee, itself, will continue such studies, and, in a final chapter, "The Next Steps," it indicates methods and directions for still others and shows the advisability of media being established for public education and public information along this line.

Social control over land use has been, so far, largely confined to cities where the public right to modify or rearrange the rights, privileges, opportunities and obligations of the individual for the increased welfare of the whole, is now generally accepted. Very little progress is shown to have been made in solving the problems of the city in its relation to the rural territory around it or to other urban centers. But population trends are all toward urban centers, with promise of future enlargement and increase of such centers. Hence the city planning problems of the future promise to be closely integrated with the problems of the larger planning, and the larger planning to become of vital concern to the city planner.

A Standard Code for Traffic Control Signal Installation and Operation.—Prepared by Miller McClintock, Director, The Albert Russel Erskine Bureau, Harvard University, Consultant, and Maxwell Halsey, Traffic Engineer, and published by the Commonwealth of Massachusetts, Department of Public Works. This is a 75-page bulletin designed to inform town and city officials of the state as to the engineering principles controlling successful installation and operation of traffic signals; and to set forth the uniform standards and practices required by the Public Works Department under a law of 1928 providing for uniform traffic control signals. A chapter of "Recommended Practice" is appended to the Standard Code, and application and permit forms for all required purposes are reproduced in facsimile. (Apply to the State Department of Public Works, Boston, Mass.)

Report of City Manager, Austin, Texas, 1928.—An annual report that, in addition to presenting all the essential statistical records bearing upon municipal matters in efficiently organized form is interesting enough to attract and hold the attention of the average citizen, is still sufficiently novel to merit comment. The typography and the whole appearance of the Austin report are exceptionally attractive. The financial data are preceded by a tabulation of "Major Accomplishments Under the City Manager Form of Government," and are followed by department reports in readable paragraph form, with a final section on "Austin the Friendly City" and numerous photographs. 90 pp. (Apply to Adam R. Johnson, City Manager.)

An Introduction to the Study of Landscape Design.—By Henry Vincent Hubbard and Theodora Kimball. The Macmillan Company, New York. Revised edition, 1929. 436 pp. + numerous full-page photographs and drawings. $6.00.

The city planner, the park superintendent, and the real estate subdivider, as well as the practicing landscape architect and the student, who have found guidance, counsel, and authority in this standard work since its first appearance in 1917, will find an added value in the new edition in which references have been brought up to date, and bibliographies and index rewritten. The limited general literature on landscape architecture, the prestige of the authors in this (as well as in the whole field of land planning), and the great breadth of treatment of the subject, entitle the book to a wide new audience. In it, the theory of landscape architecture as a fine art is extensively developed; landscape architecture as a business and a profession are discussed; and the various elements of landscape design and some of the typical problems they present, are examined. In addition to the section in which landscape parks and reservations are considered at some length, there are a number of chapters of immediate and practical importance to those who have problems connected with the planting design of public areas. Notable among them are those on "Landscape Composition," "Natural Forms as Elements in Design," and "Design of Structures in Relation to Landscape."

Methods of Compiling Housing Statistics.—No. 13, Series N. Studies and Reports, International Labor Office (League of Nations), Geneva, Switzerland, 1928, is a report on the standardization of the various municipal statistics dealing with housing problems. Its aim is to provide means of simplifying and making more effective comparison between one locality and another, and one country and another. Following a discussion of general problems including methods of investigation, and the collection and presentation of data, are chapters on Statistics of Dwellings, Statistics of Buildings with Dwellings, Statistics of Housing Conditions, Statistics of Rents, and Statistics of the Housing Market. Terms used are clearly defined in each case. A brief sketch of the history of the different branches of housing statistics is given in the introduction. 119 pp. 40c. (Apply to L. Magnusson, American Representative, 701 Lenox Building, Washington, D. C.)

Abolishing Street Traffic Intersections without Grade Separation.—By Fritz Malcher. An 8-page reprint combines the two parts of the illustrated article of this title appearing in THE AMERICAN CITY, September and October, 1929, issues, with the subtitle "A Study of Highway Planning and Traffic Control to Meet the Needs of the Motor Age." The author, a well-known Austrian architect and land planner, presents in it a system designed to have sufficient flexibility for meeting conditions of various types of municipalities, and to provide for future growth in any community. An experimental application of the plan is being made in the new town of Radburn, N. J., and application of it has already been made in a traffic plan for Havana, Cuba. Its fundamental principles include: Standards for Curves; Standards for Widths of Roadways; Use of Middle Strips; Parking; Street Crossings without Intersections of Traffic on One-Way Streets—and on Two-Way Streets with Different Density of Traffic, and with Equal Density of Traffic. (Apply to the author, 56 W. 45th St., 16th floor, New York.)

Fire-Alarm Central Stations.—An attractive booklet of 19 pages, constituting a revision and reprint of an article by W. J. Carroll from the *Quarterly* of the National Fire Protection Association of April, 1924. It is illustrated with photographs of many such stations and includes a list of instances where fire-alarm apparatus was destroyed by fire when not properly housed. Contained in the article are also lists of fire-alarm offices in fire-resistive buildings, the isolated buildings being shown separately. 1929. 15c. (Apply to the National Fire Protection Association, 60 Batterymarch St., Boston, Mass.)

The Most Nearly Perfect Food.—By Samuel J. Crumbine, M. D., and James A. Tobey, Dr. P.H. The Williams & Wilkins Co., Baltimore. 1929. XI + 292 pp. Illustrated. $2.50.

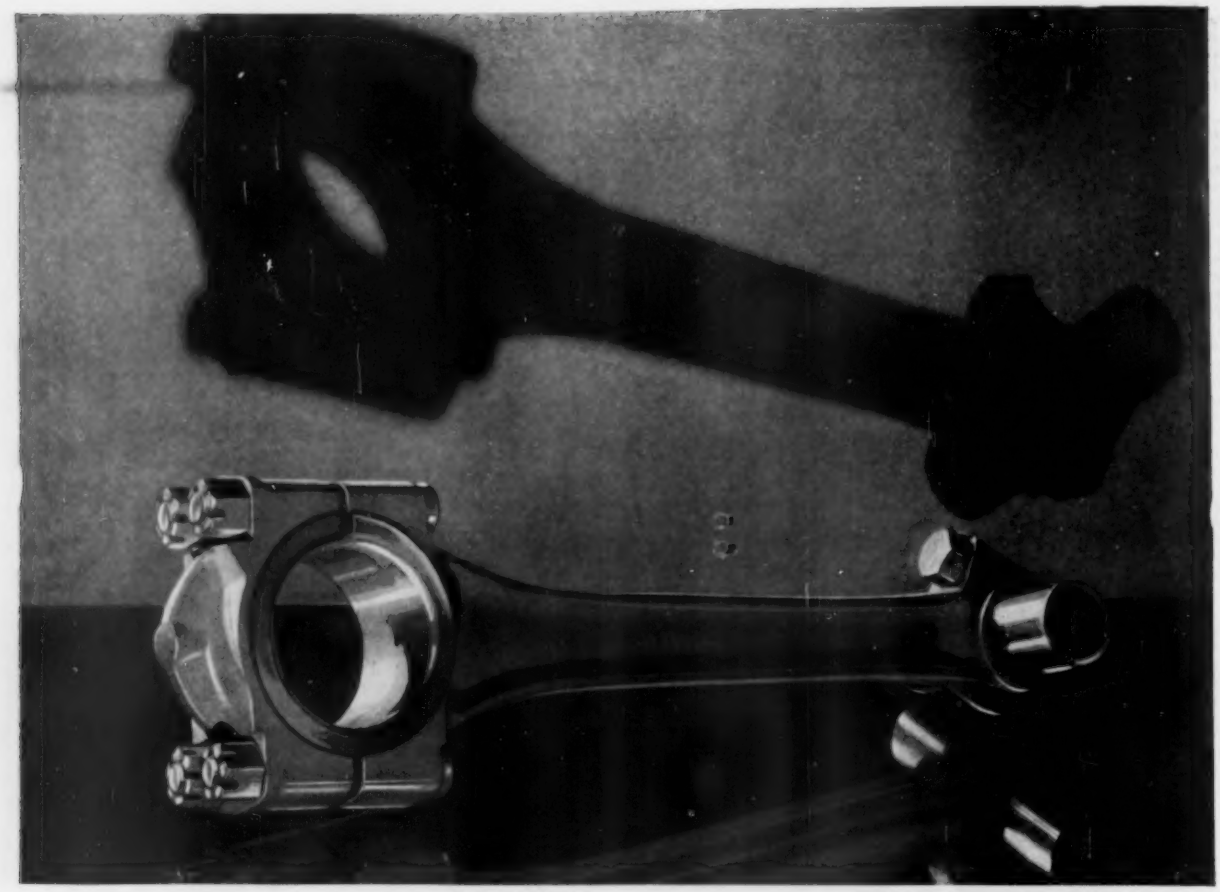
Dr. Crumbine, one of the joint authors of this book, is General Executive of the American Child Health Association of New York, and also a member of President Hoover's Planning Committee on Child Health and Protection; Dr. Tobey, well-known writer on public health, was formerly Associate Editor of the *American Journal of Public Health* and is now Director of Health Service of the Borden Company of New York. In this valuable addition to the literature on nutrition, the authors have told in a popular way the whole story of milk, the most important of the foods of man. They have set forth in an interesting manner the way milk has nourished the race throughout the ages and how it has contributed to longevity and good health. They have discussed the place of milk in the modern diet and in good cookery and have explained how to produce clean and safe milk. They have recounted the colorful methods of production and transportation of milk in various parts of the world and have described the manufacture, use, and value of the many products of milk.

Brown's Directory of American Gas Companies.—Robbins Publishing Co., Inc., New York. 672 pp. $15.00.

This standard compilation of statistics for gas companies and municipal plants in the United States, Canada and various Mexican and South American cities, is now in its 42d annual edition. The Directory portion proper covers 271 pages and is arranged under several groups—manufacturing gas, city plants; manufacturing plants, coke oven plants; natural gas companies; holding and operating companies. The data given for separate companies include capitalization, officers, operating and plant statistics, price of fuel, rates, etc. There are also included lists of public service commissions in the states and cities, having jurisdiction over gas companies, and lists of the membership of state, regional and national gas associations. The first portion of the volume is devoted to a gas engineering and appliance catalog, which, in addition to consolidated catalogs, includes book lists and an index to products and firms. The book as a whole is a valuable source of varied information regarding this utility.

Development of Newark Bay Waterfront, Bayonne, N. J.—A report and plan prepared by Harold M. Lewis, Engineer, and Charles Herrick, Assistant Engineer, and transmitted by the Bayonne City Plan Commission to the Mayor and other officials. The aim of the plan is to promote the reclamation and development of the shallow submerged areas along the west side of the city, for the uses to which they are best adapted. Such uses include an additional major highway and an expansion of residential and recreational facilities already established in that part of the city, with reservation of sufficient space for essential shipping. An extensive waterfront parkway, with suitable areas for land sports; and an extensive waterway for pleasure boating are features of the scheme. This study is an elaboration of one of the projects recommended by the Regional Plan of New York and Its Environs. Harold M. Lewis, the Planning Engineer, brought to the undertaking a familiarity with the major problem of the district, derived from his work with the Regional Plan. 86 pp. Illustrated with maps, plans, and tables. (Apply to City Plan Commission, Bayonne, N. J.)

New Construction Methods.—A 28-page illustrated article by Robert L. Davison, appearing in *The Architectural Record*, October, 1929, and available in reprint form, cardboard bound, is the result of a research undertaken at the suggestion of, and in cooperation with, the Research Institute for Economic Housing. Starting with the assumption that cheaper dwellings must be built, it examines the basic principles governing improvement of construction methods; the qualities desired in a building; the new materials and construction methods, as they evolve from present methods and those that are revolutionary in character; whether improved construction methods are commercially practical now, etc. (Apply to the publication, 119 W. 40th St., New York.)



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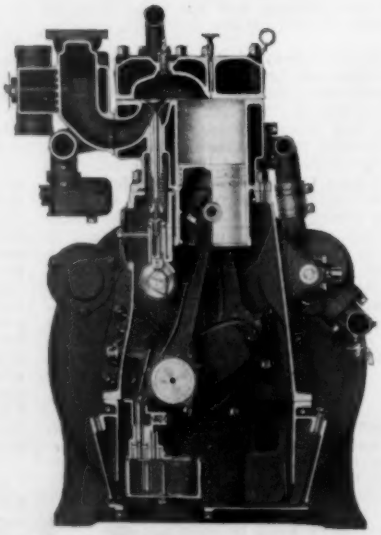

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Public Parks of Baltimore, No. 4.—The 46-page pamphlet comprising the fourth volume of the history of public parks in Baltimore, Md., as written by J. V. Kelly, and published by the Board of Park Commissioners, is devoted to detailed accounts of circumstances leading up to the establishment of Druid Hill Park. (The history of the park from 1860 is to appear later.) The work is a contribution to the early history of the acquisition of public recreation areas in America, and is an entertaining record of a developing "park mindedness." (Apply to the Board.)

Regulations for Carbon Dioxide Fire Extinguishing Systems.—A first edition of the above regulations developed by the National Board of Fire Underwriters, and recommended by the National Fire Protection Association, as of August, 1929, is available. A subsequent publication will cover carbon dioxide as a fire preventive. Such protection and prevention are called for in cases where hazards created by flammable liquids, vapors or dusts, fur storage, lumber dry kilns, coal bins, etc., are known to exist. 20 pp. (Apply to the Board, 85 John St., New York.)

A Close-up of the Regional Plan of New York and Its Environs.—A 16-page, paper-bound booklet, illustrated with maps and diagrams, tells concisely what the Plan is, and what it does for the communities and citizens of the Region; and about the organization of the Regional Plan Association, Inc., which will cooperate with local authorities in planning their own growth to conform with the principles of the greater plan. (Apply to the Association, 130 E. 22nd St., New York.)

Notes with Reference to Treatment of Banks of Streams and Other Water Areas.—The Landscape Construction Notes department of *Landscape Architecture* (quarterly), conducted by Albert D. Taylor, is devoted in the issue of October, 1929, to a subject of importance to park officials, land subdividers, and others, on which little non-technical information is available. Physical requirements for protecting the banks of water areas are discussed in detail, as are the equally important requirements for making the preservation developments of a character to contribute to the immediate landscape composition. 9 pp. (Apply to the publication, 9 Park St., Boston, Mass.)

Recent Books and Reports on Housing, Zoning, and Town Planning.—The 34-page pamphlet, issued as No. 59, Publications of the National Housing Association, October, 1929, supplements and brings up to date the publication of the same title of October, 1928. Books, pamphlets, and magazine articles are included, and material listed covers a large number of countries as well as the United States. 50c. (Apply to the Association, 105 E. 22nd St., New York.)

Other Reports Received

ALLIANCE, NEBR.—Semi-Annual Financial Statement to June 30, 1929. 14 pp.

DUBUQUE, IOWA.—Annual Report, Water Department, to March, 1929. 56 pp.

NEW ORLEANS, LA.—Semi-Annual Report, Sewage and Water Board, to December 31, 1928. 228 pp.

NEW YORK CITY.—Annual Report, Board of Water Supply, 1928. 116 pp.

PLAINFIELD, N. J.—Annual Municipal Report, 1928. 92 pp.

CONVENTIONS—WHEN AND WHERE

NOVEMBER 4-6.—HIGH POINT, N. C.
American Water Works Association—North Carolina Section. Annual meeting. Secretary-Treasurer, H. G. Baity, School of Engineering, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 6-8.—SIOUX FALLS, S. DAK.
American Water Works Association—Missouri Valley Section (formerly Iowa Section). Annual meeting. Secretary, Earl L. Waterman, Room 104 N, Engineering Building, University of Iowa, Iowa City, Iowa.

NOVEMBER 12-15.—SAN ANTONIO, TEXAS.
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 1222 National Press Building, Washington, D. C.

NOVEMBER 12-14.—CHICAGO, ILL.
Governmental Research Association. Annual meeting. Secretary-Treasurer, Russell Forbes, 261 Broadway, New York.

NOVEMBER 12-14.—CHICAGO, ILL.
National Association of Civic Secretaries. Annual meeting. Secretary, Miss Harlean James, 905-07 Union Trust Building, Washington, D. C.

NOVEMBER 12-14.—CHICAGO, ILL.
National Municipal League. Annual convention. Secretary, Russell Forbes, 261 Broadway, New York.

NOVEMBER 13-16.—BILOXI, MISS.
American Institute of Steel Construction, Inc. Annual convention. Executive Director, Charles F. Abbott, 285 Madison Avenue, New York.

NOVEMBER 13-15.—CHICAGO, ILL.
American Municipal Association. Annual meeting. Executive Secretary, J. G. Stutz, Lawrence, Kans.

NOVEMBER 14.—CHICAGO, ILL.
Proportional Representative League. Annual meeting. Executive Secretary, George H. Hallett, Jr., 311 South Juniper Street, Philadelphia, Pa.

NOVEMBER 14-15.—OSHAWA, ONT.
Ontario Associated Boards of Trade and Chambers of Commerce. Annual meeting. Secretary-Treasurer, T. Marshall, Royal Bank Building, Toronto, Ont.

NOVEMBER 18-21.—MIAMI, FLA.
American Association of Zoological Parks and Aquariums. Annual meeting. Secretary, Will O. Doolittle, Box 422, Tulsa, Okla.

NOVEMBER 18-21.—MIAMI, FLA.
The American Institute of Park Executives and American Park Society. Annual convention. Executive Secretary, Wm. H. Walker, South Bend, Ind.

NOVEMBER 20-22.—EDMONTON, ALTA.
Alberta Association of Municipal Districts. Annual convention. Secretary, E. Pinchbeck, Spruce Grove, Alta.

NOVEMBER 20-23.—FORT WORTH, TEXAS.
International City Managers' Association. Annual convention. Executive Secretary, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.

NOVEMBER 20-23.—MUSCLE SHOALS, ALA.
The Public Ownership League of America. Conference. Secretary, Carl D. Thompson, 127 North Dearborn Street, Room 1439, Chicago, Ill.

NOVEMBER 26-27.—CUSHING, OKLA., and
NOVEMBER 28.—STILLWATER, OKLA.
Oklahoma Municipal League. Annual convention. Executive Secretary, J. T. Salter, University of Oklahoma, Norman, Okla.

DECEMBER 2-3.—GULFPORT, MISS.
American Shore and Beach Preservation Association. Annual convention. Secretary-Treasurer, R. S. Patton, National Research Council, Washington, D. C.

DECEMBER 2-6.—NEW YORK.
American Society of Mechanical Engineers. Annual meeting. Secretary, Calvin W. Rice, 29 West 39th Street, New York.

DEBEMBER 3.—NEW YORK.
American Institute of Weights and Measures. Annual meeting. Secretary, W. E. Bullock, 115 Broadway, New York.

DECEMBER 3-5.—EDINBURG, TEXAS.
Texas Association of Sanitarians. Seventh Texas Sanitarians' Short School. Secretary, E. C. Eggert, Texas State Board of Health, Austin, Texas.

DECEMBER 4-6.—CHICAGO, ILL.
National Paving Brick Manufacturers Association. Annual meeting. Secretary, Q. A. Campbell, 1245 National Press Building, Washington, D. C.

DECEMBER 6-7.—ASBURY PARK, N. J.
New Jersey Public Health and Sanitary Association. Annual meeting. Secretary, Dr. Edward Guion, Box 418, Atlantic City, N. J.

DECEMBER 6-7.—GALVESTON, TEXAS
Texas City Attorneys' Association. Annual convention. Executive Secretary, Harvey W. Draper, 319 Kress Building, Houston, Texas.

DECEMBER 10-11.—WASHINGTON, D. C.
National Rivers and Harbors Congress. Annual convention. Secretary-Treasurer, S. A. Thompson, 824 Colorado Building, Washington, D. C.

JANUARY 20-24.—LAFAYETTE, IND.
Purdue Road School. Annual school. Address: Professor Ben H. Petty, Engineering Extension Department, Purdue University, Lafayette, Ind.

DECEMBER 12-13.—WASHINGTON, D. C.
Highway Research Board, National Research Council. Annual meeting. Director, Roy W. Crum, B and 21st Streets, Washington, D. C.

DECEMBER 16-17.—LAKE WALES, FLA.
Florida League of Municipalities. Annual meeting. Secretary-Treasurer, E. P. Owen, Jr., 1601-05 Lynch Building, Jacksonville, Fla.

DECEMBER 27-30.—WASHINGTON, D. C.
National Community Center Association. Annual meeting. Secretary, LeRoy E. Bowman, 403 Fayerweather Hall, Columbia University, New York.

JANUARY 9-11.—LAWRENCE, KANSAS.
Kansas Engineering Society. Annual meeting. Secretary, J. M. Averill, Route 7, Topeka, Kans.

JANUARY 9-10.—HASTINGS, NEBR.
League of Nebraska Municipalities. Annual meeting. Secretary, J. H. Hale, 1304 Fifth Street, Kearney, Nebr.

JANUARY 11-18.—ATLANTIC CITY, N. J.
American Road Builders Association. Annual convention and Road Show. Secretary-Director, Charles M. Upham, National Press Building, Washington, D. C.

JANUARY 16.—POCATELLO, IDAHO.
Idaho State Chamber of Commerce. Annual meeting. Secretary, Ralph E. Thomas, 529 Idaho Building, Boise, Idaho.

JANUARY 18.—NEW YORK.
American Social Hygiene Association. Annual meeting. General Director, Dr. William F. Snow, 370 Seventh Avenue, New York.

JANUARY 27-30.—PHILADELPHIA, PA.
American Society of Heating and Ventilating Engineers. Annual meeting. Secretary, A. V. Hutchinson, 29 West 39th Street, New York.

JANUARY 27-31.—NEW YORK.
American Institute of Electrical Engineers. Annual winter convention. National Secretary, F. L. Hutchinson, 33 West 39th Street, New York.

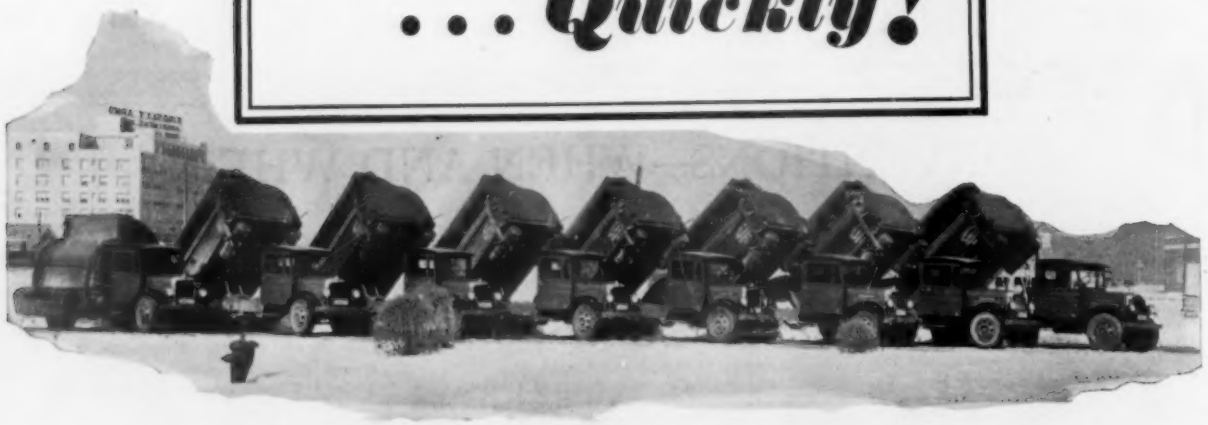
JANUARY 27-30.—ABILENE, TEXAS.
Texas Water Works Short School. Annual session. Address: V. M. Ehlers, Southwest Water Works Association—Texas Section, Austin, Texas.

FEBRUARY 12-14.—OTTAWA, ONT.
Engineering Institute of Canada. Annual meeting. Secretary, R. J. Durley, 176 Mansfield Street, Montreal, Que.

FEBRUARY 23-27.—ATLANTIC CITY N. J.
National Education Association, Department of Superintendents. Annual meeting. Executive Secretary, Sherwood D. Shankland, 1201 16th Street, N. W., Washington, D. C.

FEBRUARY 25-28.—WICHITA, KANS.
Southwest Road Show and School. Annual Show and School. Manager, F. G. Wieland, Exposition Building, Water and Williams Streets, Wichita, Kans.

ASBURY PARK Gets Rid of Refuse ... *Quickly!*



ASBURY PARK, N. J., has the reputation of being one of the country's cleanest and most healthy cities, and this battery of General Motors Trucks help keep it so.

The work speed, and day-in and day-out dependability of the G. M. T. units is a big aid in quick disposal of waste and refuse, according to Mr. Harry B. White, Director of the Department of Public Safety.

"We can count on these trucks to do their work with speed and dispatch, and we know that they will stay on the job until it's done. On top of that we're highly pleased with the trucks' operating economy and the fact that their ruggedness keeps them out of the repair shop," he adds.

A total of 10 General Motors Trucks are in the service of Asbury Park.

It will pay *you* to know about the impressive records General Motors Trucks are rolling up in all types of city haulage. Bringing new work-ability and work-speed. Contributing greater safety in traffic. Cutting operating and maintenance costs. Delivering tens of thousands of miles of economical service long after flimsier vehicles have become expensive liabilities.

These advancements result directly from 27 years of actual truck experience—plus resources and facilities unequaled in the industry, General Motors Research Laboratories, for example, and General Motors great Proving Grounds.

Investigate this great line of modern vehicles. Write, phone or call.

GENERAL MOTORS TRUCKS

GENERAL MOTORS TRUCK COMPANY, Pontiac, Michigan

(Subsidiary of Yellow Truck & Coach Mfg. Co.)

GENERAL MOTORS TRUCKS, YELLOW CABS AND COACHES

Factory Branches, Distributors, Dealers—in 1,500 principal cities and towns

(Time payments financed through Y. M. A. C. plan, at lowest available rates)

ALWAYS INVESTIGATE WHAT GENERAL MOTORS HAS BEFORE YOU BUY

NEWS AND ILLUSTRATIONS

Items *of* Interest *to* City, Town *and* County Officials, *and* Others Concerned *with the* Economical Construction *and* Efficient Operation *of* Public Improvement Undertakings

SNOW THROWN FAR BEYOND THE RIGHT-OF-WAY

Snow Removal from Highways and City Streets

After a thorough study of snow-removal problems, the Klauer Manufacturing Co., Dubuque, Iowa, developed the Snogo snow remover for effective work on highways, city streets and airports. As the first and most important requirement for rotary snow-removal equipment is power, Snogo has been built as a complete unit with a power-plant of sufficient size for every requirement, eliminating the necessity of auxiliary motors. It is powered with a 6-cylinder valve-in-head motor, capable of developing 175 horsepower at 1,200 r.p.m. It has a 30-gallon capacity radiator with pump circulation and 30-inch four-blade fan, two 1¾-inch carburetors with manifold hot-air stove, dual high-tension magneto and battery system with twelve spark plugs and automatic governor set at 1,000 r.p.m.

The instrument panel mounted in the cab ahead of the steering wheel includes ignition switch, oil pressure gage, ammeter and temperature indicator. The lighting system consists of two headlights mounted on the front of the cab and a tail-light. The gasoline tank is of 125-gallon capacity, mounted just back of the cab, and has gravity feed to the carburetors. The chassis is of heavy pressed steel of special design, hot-riveted and with seven cross members all gusseted, the springs being of the semi-elliptic type of alloy steel with overload springs on the rear. The Timken Detroit rear axle is of the full floating type with worm gear drive, and duplex internal expanding brakes.

The augers, which are mounted at the front of the machine, are 18 inches in diameter with flights of 5/16-inch steel plate mounted on heavy tubular steel shafts, and are carried on self-aligning annular ball bearings at the ends. These powerful augers, cutting across the snow, feed it to the rotor fan at the rate of maximum capacity, and assure an efficient ratio between the power expended and the work done, at the same time eliminating any possibility of the fan's being oversupplied. At the top of the hood and at the extreme right and left are extension blades. They extend at an angle forward from the hood and, working in deep snow, they cut it so that it will drop of its own weight down in front of the augers. In exceptionally deep plowing these cutting bars have been used successfully up to a height of 10 feet above the hood. This entire hood is virtually geared to the road, preventing its being raised by the snow.

The centralized control of all working parts from the cab is an exclusive feature that will appeal to the operator. The steering wheel, gear shift levers, clutch and brake pedals, instruments, etc., are located for left-hand drive. The control

CUTTING INTO A DEEP DRIFT

which raises or lowers the front hood, the direction control of the spout, the auxiliary steering vane levers and the clutch control which disengages the entire front mechanism, are all conveniently located in the cab adjacent to the driver's seat. The adjustable tip of the loaded hood which controls the snow distribution in loading operations is raised or lowered by a hand wheel located ahead of the cab and operated from the step.

To safeguard against damage, both the augers and the rotor fan are driven through a safety device designed on the principle of shearing-pins which are of known tensile strength and will withstand a predetermined pressure. Any pressure beyond this point will cause them to shear instantly, immediately stopping the augers or rotor fan and causing the motor to run idle.

One of the most important features of the Snogo rotary snow remover for highway work is direction control. The chute at the head of the fan case is controllable from the cab and may be swung to the extreme right or left, giving positive control. The snow can be thrown over 100 feet in either direction, over houses or telegraph wires if necessary, or to the downhill side in mountain work.

Attaching or dismounting the loading hood for use in loading trucks in city street work, requires only about 15 minutes, and in many instances for highway work it is not even necessary to remove the loading hood. The outer section can be raised to a vertical position, and the chute will then throw the snow straight out from the machine.

There is no delay in loading trucks with this machine and no backing-up or maneuvering of receiving trucks to get in position to receive the snow. The trucks run on the traffic side of the Snogo machine, one truck after another. If there is sufficient snow on the ground, this machine will load a truck in 20 seconds. The compression of the snow caused by the augers, the force of the fan and the principle of the loading chute, increase the capacity of the receiving trucks. By comparison with snow which is dropped into trucks, the cubical contents capacity is increased four or five times. No manual aid is required to break up the snow.

General Chemical Co. Moves Philadelphia Office

The General Chemical Co., 40 Rector St., New York, has announced the removal of its Philadelphia office from the Packard Bldg., 15th & Chestnut Streets, to the Liberty Trust Building, 1343 Arch Street.

SPEEDY DELIVERY OF SNOW FROM WINDROW TO TRUCK

GOODYEARS get there safely!

In Minneapolis, the Fire Department uses Goodyear All-Weather Tread Pneumatic Truck Tires on this American La France pumper

IN the clanging rush through crowded streets—in the speeding swing around corners—when life and property may depend upon precious seconds—nothing less than the famous Goodyear All-Weather Tread deserves the responsibility for traction.

In the body of the tires, Goodyear SUPERTWIST Cords add the extra vitality required to meet the extra stress of speed...

There is a Goodyear Tire which parallels every requirement of municipal duty with equal accuracy: Goodyear Heavy-Duty Cushions, for trucks used in street maintenance and sprinkling—Goodyear All-Weather Tread Pneumatics for educational department cars, inspection and other light travel—the Goodyear plain tread trailer tire, high in profile and extra resilient in cushioning, for garbage hauling. Call in a Goodyear Truck Tire Service Station Dealer.

On Your New Trucks Specify Goodyears

GOODYEAR

Copyright 1929, by The Goodyear Tire & Rubber Co., Inc.

More Tons Are Hauled on Goodyears Than on Any Other Tires

FIGHTING CAREFULLY PREPARED AIRPLANE FIRE WITH FIREFOAM

This photograph was taken just before the discharge from two small Foamite Firefoam generators was turned on. About 20 seconds later the intensity of the fire was noticeably reduced and in three minutes the fire was completely extinguished

Are You Prepared to Fight Airplane Fires?

What happens when an airplane crashes and takes fire was graphically demonstrated recently at the Utica, N. Y., testing grounds and experimental station of the American-La France and Foamite Corporation, Elmira, N. Y. The tests, which were conducted on two actual airplanes which were purchased especially for the occasion, were witnessed by Canadian aviation officials and were arranged in cooperation with the Canadian Department of National Defense.

In order that the test should represent actual conditions, each plane was set up as follows: The fuselage resting on the ground, lower wings draped from the lower part of the plane to the ground, upper wings supported by frames and elevated above the cockpit in practically a horizontal position, 50-gallon steel drums placed in the nose of each plane, perforated at the bottom and filled with about 12 gallons of high-test gasoline. When a plane crashes, the gas and oil tanks usually become ruptured. Therefore, to duplicate these conditions, between 20 and 30 gallons of high-test gasoline and about 3 gallons of oil were thrown over the ground and into the motor compartment of each plane.

Fire in the first plane was fought with Alfite, a carbon-dioxide gas, contained in eight 50-pound Alfite cylinders in two batteries of four cylinders each. The two batteries were manifolded together and four flexible metal high-pressure hose lines connected the manifold to the four flexible Alfite discharge nozzles. The fire was started and when it had progressed to the fuselage and wings the Alfite gas was directed toward the fire by four men, each operating one discharge nozzle. It was difficult for the men to approach close enough to the burning plane to do effective work, because of the intense heat generated by the burning wings. In a few seconds, however, the inflammable wing fabric had burned away, and it was then possible for the operators to advance directly toward the gasoline fire, which was by this time concentrated under the forward part of the fuselage. The first battery of four cylinders, which was discharged in less than one minute, was not sufficient to extinguish the fire. The second four cylinders were then utilized and the operators succeeded in completely extinguishing the fire. They had scarcely retired, however, when a reflash occurred which reignited exposed gasoline on the ground. It was necessary to extinguish this reflash with Foamite equipment.

The second plane fire was fought with Firefoam, generated by two small Foamite generators. This fire was a more serious one with which to contend because of the fact that the plane was larger and more gasoline was used than for the first test. Within a few seconds after the Firefoam was introduced, the two operators were able to cut down the intensity of the fire to such an extent that they could approach in close proximity to it without taking punishment from the heat. The fire was well under control within twenty seconds and completely extinguished within three minutes.

The advantage of Firefoam in fighting such fires is that it may be discharged by an operator from a distant point because of the range of the stream. In addition, wherever it is applied, it is effective in cutting down the heat of the fire and will adhere to any surface to which it is applied, rendering that material noninflammable.

A New Cast Iron Pipe Lining

Although Bitumastic lining for cast iron pipe is not a new development in the field of pipe construction, the difficulty of application to the inner surface of large diameter pipe has been a handicap to its widespread use. The new centrifugal method recently developed by the Wailes Dove-Hermiston Corporation, New York, in cooperation with the engineers of the United States Pipe and Foundry Co., Burlington, N. J., is efficient, rapid and economical.

By this method the Bitumastic enamel is heated in a cauldron to the proper melting temperature, the pipe to be coated having been previously dipped in a priming coat and allowed to completely dry. The pipe is placed on rollers driven by an electric motor, and is caused to rotate rapidly. The correct amount of Bitumastic enamel is poured into a steam-heated trough, which is run into the rotating pipe and tipped over evenly, distributing the Bitumastic lining along the entire length of the pipe. The material is quickly distributed by centrifugal force over the entire inner surface of the pipe, and rotation is continued until the material has completely hardened. If a double lining is required, the second layer is put on after the first is entirely solidified. In this way a layer of Bitumastic enamel of any desired thickness may be applied without difficulty.

This lining is resistant to both concentrated and dilute acids, as well as to alkalis and corrosive liquids of all types and degrees. For systems which carry waters impregnated with sulphur and whose reaction is therefore slightly acid, this lining is recommended.

In addition to the resistance of this lining to the various liquids which may be passed through the pipe, the smooth, glossy surface presents no lodging-place for tubercles or other growths with which it may come in contact. This smooth surface, which resembles baked enamel, also permits the water to flow through the pipe with less friction loss than in uncoated pipe.

An example of the efficiency of this lining is found in the parallel 36- and 42-inch lines which form the Narrows siphons carrying the water-supply to Staten Island, N. Y. The older of these lines has been in service over fifteen years carrying soft water. The last examination showed the Bitumastic lining to be in excellent condition, and the lines have retained their full carrying capacity.

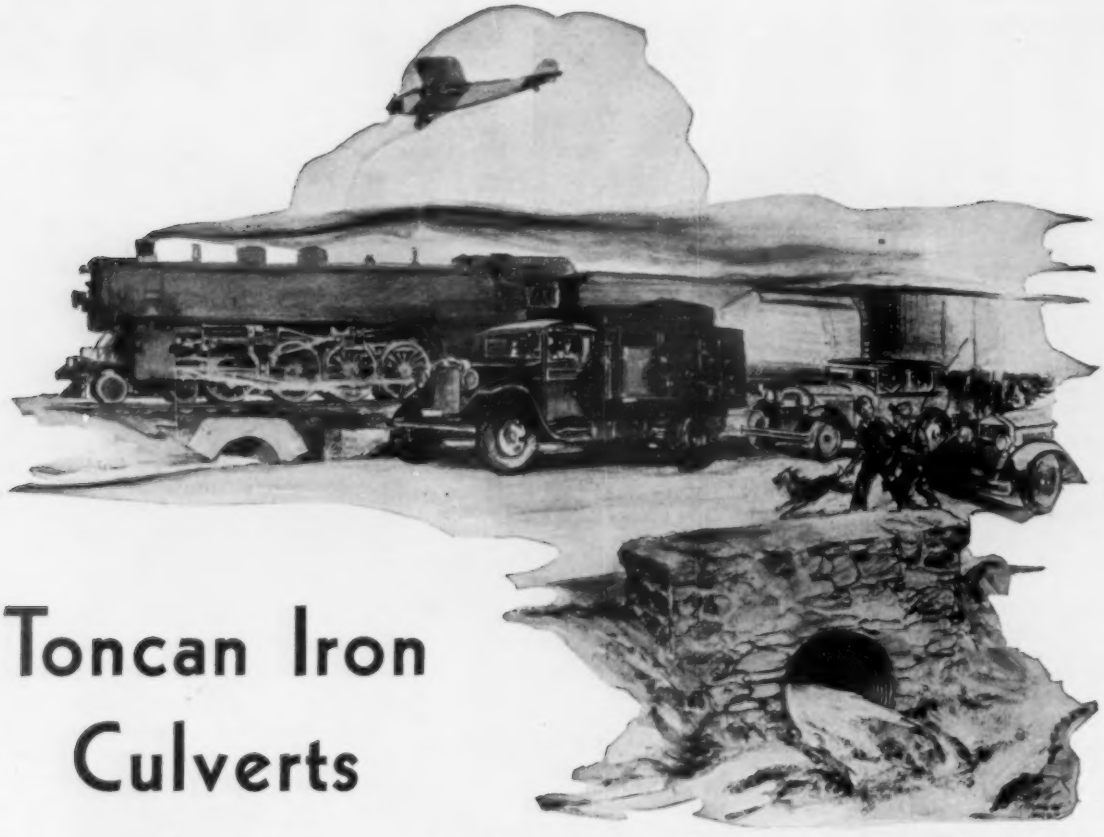
A Journal of Interest to Well Drillers and Water-Supply Men

The Johnson National Drillers' Journal, published by Edward E. Johnson, Inc., 2302-2304 Long Avenue, St. Paul, Minn., was first issued in September, 1929. It is intended as a medium for all who are interested in well drilling for water-supplies and has been made the official organ of the American Association of Water Well Drillers.

Any of our readers who would be interested in receiving the Journal may have their names placed on the mailing list by writing to W. M. Bollenbach, Edward E. Johnson, Inc., St. Paul, Minn., and mentioning THE AMERICAN CITY.

A TEST OF A WELL BY K. M. BROWN, PRESIDENT, AMERICAN ASSOCIATION OF WATER WELL DRILLERS

An illustration from the first issue of "The Johnson National Well Drillers Journal"



Toncan Iron Culverts

—A Great Advance In Iron Alloy

METALLURGICAL research has brought new qualities to familiar metals.

In the airplanes and automobiles of today, only alloy steels can stand the terrific strain. Common steels can't meet modern requirements. We are living in the Alloy Age.

Alloying makes steels stronger, tougher, safer. More important still to culvert buyers, rust and corrosion have gone down to defeat before it.

In the culvert field, Toncan Iron is the most highly alloyed material made today. It combines pure iron, copper and molybdenum in scientific proportions—the first great advance in culvert iron in a generation. The result is a modern material with a superior resistance to rust and corrosion.

Specifiy Toncan Iron—the modern culvert material.

TONCAN COPPER Mo-lyb-den-um IRON

TONCAN CULVERT MANUFACTURERS' ASSOCIATION, MASSILLON, OHIO

The Canton Culvert & Silo Co., Canton, Ohio
The Berger Mfg. Co., of Mass., Boston, Mass.
The Berger Manufacturing Co., Philadelphia, Pa.
The Berger Manufacturing Co., Roanoke, Virginia
The Berger Manufacturing Co., Jacksonville, Florida
The Berger Manufacturing Co., Dallas, Texas
The Berger Manufacturing Co., Minneapolis, Minn.
The Berger Manufacturing Co., (Export), Canton Ohio
Tri-State Culvert Mfg. Co., Memphis, Tenn.
Tri-State Culvert Mfg. Co., Atlanta, Ga.
The Firman L. Carswell Mfg. Co., Kansas City, Kan.
Wheat Culvert Co., Inc., Newport, Ky.
Beall Pipe & Tank Corp., Portland, Ore.
Superior Culvert & Flume Mfg. Co., Los Angeles, Calif.
Superior Culvert & Flume Mfg. Co., Oakland, Calif.
The Thompson Mfg. Co., Denver, Col.
The Pedlar People Limited, Oshawa, Ontario, Canada

TONCAN COPPER MO-LYB-DEN-UM IRON

STARTING THE INSTALLATION BY UNROLLING A COIL OF TUBING

Making a Typical Copper Water-Service Tubing Installation

The use of copper tubing for house services is increasing so rapidly that we are printing here a description of a typical installation, the illustrations for which are furnished through the courtesy of the Chase Brass & Copper Co., Inc., Waterbury, Conn.

All that is needed to start work is the copper tubing itself, the usual fittings, a hack-saw, hammer, reamer and a good strong knife, all of which can easily be taken in the rumble seat of a roadster. There is no need of a heavy work-bench or pipe vises which must be transported by truck. The installation is started by unrolling the coil of tubing, which is flexible and easily handled. The tubing is straightened by hand and sawed off to the desired length with an ordinary hack-saw.

Inasmuch as sawing the pipe leaves a burred inside edge which impedes the flow of water if not removed, a strong knife is used as a reamer to remove the burr. After the reaming a slip-nut is placed over the tubing and the end of the tubing is flanged with a Chase flanging tool and hammer. The fitting is screwed onto the slip-nut that was placed on the tubing before the flanging operation. This is a much quicker job than cutting pipe threads as is necessary with the old service pipe installations.

The trench can be filled in as quickly as the installation progresses and without any danger of injuring the tubing by the settling of the ground. Tests have shown that the Chase copper water-service tubing joined with Chase fittings will withstand any reasonable pull, pressure or strain of city water service. The tubing is so flexible that it is easy to make a gooseneck without any tools or bending devices and, in fact, any complicated reverse bends can be easily made around boulders, conduits or other obstacles in the trench.

Due to the ease and speed of installation, the time is cut over 80 per cent. Not only is less labor required to work the pipe around obstructions, but there is a further saving in the quicker and easier flanging operation.

REAMING THE BURRED INSIDE EDGE WITH A STRONG KNIFE AFTER SAWING

USING FLANGING TOOL AND HAMMER AFTER PLACING SLIP NUT OVER TUBING

SCREWING FITTING ONTO SLIP NUT

COMPLETING THE INSTALLATION FROM THE CURB STOP TO THE HOUSE METER. NOTE NARROW TRENCH USED

H. S. Greene Becomes an Executive of the Chain Belt Co.

Hibbard S. Greene, former Vice-President and Director of the Barber-Greene Co., Aurora, Ill., has been appointed Assistant to the President of the Chain Belt Co., Milwaukee, Wis. Mr. Greene's duties will be to coordinate the marketing plans of the Chain Belt Co., Sivyer Steel Casting Co., Federal Malleable Co., and the Interstate Drop Forge Co., all of Milwaukee, as well as the Stearns Conveyor Co., of Cleveland, Ohio, the latter company being a division of the Chain Belt Co.

Contract Awarded for New Elevated Steel Tank

Edward K. Mather, Managing Engineer, Dakota Engineering Co., Mitchell, S. Dak., reports that the contract for a 100,000-gallon steel tank or 90-foot steel tower, together with incidental work, for the city of Flandreau, S. Dak., has been awarded to the Chicago Bridge & Iron Works, for $10,150.

COMPLICATED REVERSE BEND, SHOWING HOW PIPE CAN BE WORKED AROUND BOULDERS, CONDUITS OR OTHER OBSTACLES

Mt. Hope Avenue, Rochester, N. Y., at 9 A. M., before treatment with Solvay Calcium Chloride, showing covering of ice on the traveled way

In the circle is shown a truck applying Solvay Calcium Chloride on Rochester Streets

Mt. Hope Avenue at 12.10 P. M., the same day, showing how rapidly the ice is disintegrated under the action of Solvay Calcium Chloride

How the City of Rochester

PREVENTS ACCIDENTS ON ICY PAVEMENTS

The above illustrations show how successfully the city of Rochester, New York, removes ice from pavements through the use of Solvay Calcium Chloride.

For removing ice Solvay Calcium Chloride is applied in solution or in a dry state directly to the ice.

Many municipalities and railroads use Solvay Calcium Chloride to keep bus stops and traffic stops free from ice; to melt ice in sewers and catch basins; melt ice on steep hills, streets, steps, sidewalks; dangerous crossings, bridges, tracks, and third rails; protect bridge piers from ice pressure; and to break ice jams in rivers.

Our Technical Service Department has made a special study of the use of Solvay Calcium Chloride in removing ice and is prepared to give you advice regarding your special problems in this field.

Send for Booklet No. 1065

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street **New York**

SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

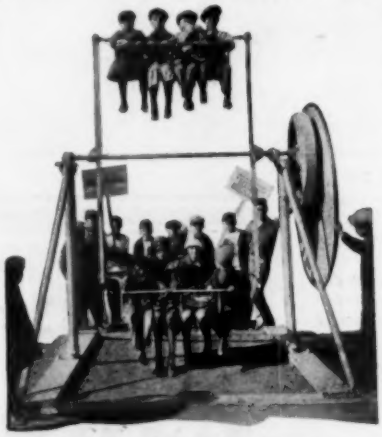
Calcium Chloride

Flake 77%-80%

During November we hope you will remember to mention THE AMERICAN CITY

A New Playground Swing

A new type of swing for parks, schools, municipal pools or bathing beaches, and playgrounds has been developed by the Whirl-Over Swing Co., Chickasha, Okla. This Whirl-Over swing, which resembles a small, two-compartment Ferris wheel, is made entirely of steel and turns on roller bearings. It is regulated by a governor which is heavy enough to control the motion. The ratio of the governor to the swing is approximately 8 to 1, so that the governor turns about eight times as fast as the swing, making it impossible for the swing to jerk, lock, bang,



THE WHIRL-OVER SWING

drop or run away. The children sit in baskets, so that they cannot fall out.

This swing is made in several sizes, for use with or without a motor. The medium-size swing is about 8 feet high, and the giant size, with which a motor may be used, is 10 feet high. The highest point to which the children go is from 10 to 12 feet, according to the size of the swing. If a motor is not used, a slight push starts the swing in motion.

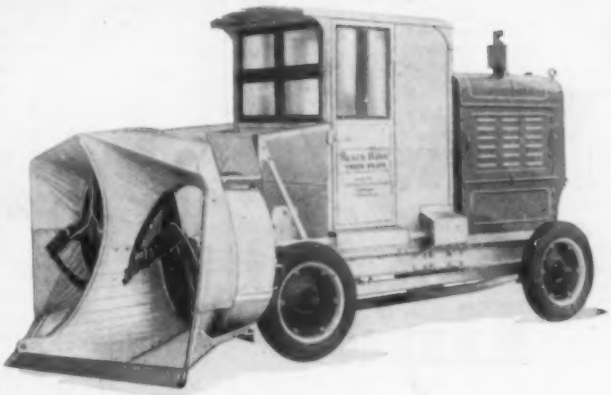
For best results the Whirl-Over should be securely fastened to the ground, with the supports set in concrete, although the smaller size is made as a portable unit.

Complete Snow Removal

Municipal officials realize that the proper removal of snow from streets and highways minimizes spring repairs. First consideration must, of course, be given to opening a path for traffic and, after this is done, the ditches and shoulders can be cleared at leisure to protect the road against disastrous seepage.

For completely removing snow from the road surface, the Construction Machinery Co., Waterloo, Iowa, has developed the Blackhawk, a rotary snow-plow in which the twin, powerful rotors are fed continuously by the V-type prow and a pair of ribbon type screw conveyors. The rotors revolve at a test-fixed speed and the cuplike blades hurl the snow entirely clear of the road. By the use of deflectors in conjunction with each rotor, the snow can be thrown to both sides of the road at once or all thrown to one side.

The speed of the machine varies, with the condition of the snow and the depth of the drifts, from 8 to 10 miles per hour under easy conditions and proportionally slower in deep snow or wet sticky conditions. Power is transmitted through an extra strong push bar from the tractor or heavy truck to which the plow is attached directly to the nose of the plow. The frame of the unit is made of heavy structural steel rigidly reinforced, hot-riveted and arc-welded together, and designed for maximum working stresses. The prow is constructed of heavy steel-plate arc-welded together and the cutter bar is made of hardened steel, sharpened.



BLACKHAWK ROTARY SNOW-PLOW

The two rotors are 39½ inches in diameter and are made entirely of steel and electrically welded. Each rotor is fed by a ribbon screw conveyor equipped with a pulverizer for breaking up ice and hard-packed snow to insure easy disposal through the rotors. The deflectors are constructed of heavy steel plate and are easily shifted with a conveniently located lever to control the direction in which the snow is to be thrown. The controls are grouped in a roomy all-steel cab for convenient and easy operation, and the whole outfit is mounted on balloon-type pneumatic tired disc wheels with Timken tapered roller bearings and automotive steering. The transmission is of the silent high-speed roller-chain type with machine-cut gears, and the power-plant is a heavy-duty 55-horsepower multi-cylinder industrial engine. The machine is equipped with Alemite-Zerk lubrication throughout.

Edson Moves to New Building in Boston

The Edson Manufacturing Co., makers of portable diaphragm pumps, has moved to its new building, at 49-51 D Street, South Boston, Mass. This is the second move this company has made in ten years, both moves being necessary to take care of increasing business.

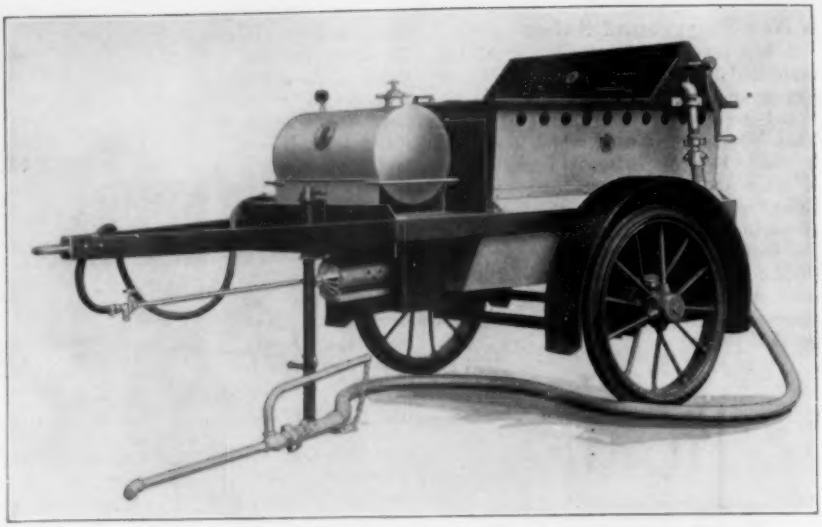
Central Iron & Steel Moves Boston Office

The Central Iron & Steel Co., Harrisburg, Pa., manufacturer of Central floor plate and steel sheets and stampings, has announced a change in the address of its Boston office from 131 State Street, to the Statler Office Bulding, Park Square. G. T. Armstrong is still in charge of this office.

MARKING A DANGEROUS TRAFFIC OBSTRUCTION IN PHILADELPHIA

One of the patrols of the Automobile Club of Philadelphia placing an Eveready portable automatic flasher in front of a concrete mixer parked by the side of the road. This signal is used, as it has greater warning power than the ordinary kerosene lantern and is more cheaply operated

Now is the Time!



IF you intend to do any winter maintenance work on your highways be sure to equip your department with a Littleford Hand Spray. Here is the reason: In cold weather the only way to make tar or asphalt penetrate through a patch to the road is by *application of hot material under pressure.* It is the only way to get a lasting patch. The Littleford Hand Spray *applies material to patches just as a large pressure distributor applies it to a large job.*

The Hand Spray, shown here with the Littleford Oil Burning Asphalt Kettle No. 84-W, can be fitted to kettles of any size or make. It eliminates the use of pouring pots, applies hot material direct from kettle to patch, under pressure and without loss of heat.

Now is the time to equip your highway department for winter maintenance. Write for bulletin E-12. It gives complete information about the Hand Spray.

LITTLEFORD BROS.
500 *East Pearl Street* *Cincinnati, Ohio*

LITTLEFORD
ROAD & STREET MAINTENANCE EQUIPMENT

1930
CONVENTION & ROAD SHOW
A. R. B. A.
ATLANTIC CITY N.J.
JAN. 13-18

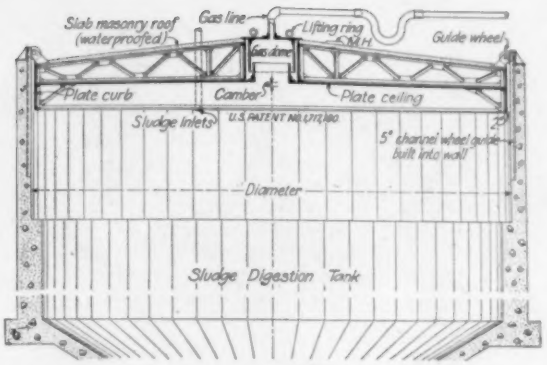
Better Truck Snow Plows For Your City Streets

Put good snow plows on your trucks. Baker Straight Blade Truck Snow Plows with the patent safety tripping blades lead the field, not only is safe snow moving but in year-after-year service. Hundreds of cities purchase Baker Plows season after season because of the good work they did the year before. "100 per cent satisfaction" is the way one city manager puts it. You get the same good results with other Baker plows, "V" and blade types, for trucks and tractors.

Write for Snow Plow Bulletins—Mention name and model of trucks and tractors

The BAKER MFG. CO. 503 Stanford Avenue, Springfield, Ill.

BAKER SNOW PLOWS
FOR MOTOR TRUCKS AND TRACTORS



SECTION OF A DOWNES FLOATING SLUDGE TANK COVER

The Downes Floating Cover for Separate Sludge Digestion Tanks

The simplicity of operation and the resulting efficiency of the separate sludge digestion method of sewage treatment are further insured by the use of the Downes floating cover. As developed by the Pacific Flush-Tank Co., 9 Park Place, New York City, these covers are made of steel and properly insulated.

Floating upon the surface of the sludge at all times, these covers permit of sludge addition or removal without any possibility of entrance of oxygen into the tank. If oxygen is permitted to come in contact with digesting sludge, an explosion hazard is created and the biological action that is the basis of digestion is seriously interfered with.

The top plate of the cover, being cambered, permits the gas to travel to the center to the combined gas collector and sealed inspection-manhole, from which it is piped to a suitable gas burner. The water thus heated circulates through coils in the tank, maintaining an optimum sludge temperature at all times. The gas burns with all the characteristics of illuminating gas, although its B.t.u. value, while variable, is about 700 per cubic foot in comparison to 1,000 per cubic foot for ordinary commercial gas.

The result of absolute exclusion of oxygen and the maintenance of relatively high temperature sludge permits of digestion in the shortest length of time; usually about 36 days for complete digestion. Such conditions also allow regular daily additions of fresh sludge in amounts as high as 2.77 per cent of old sludge, according to John R. Downes, who is the inventor of the cover and who has had them in use for a number of years in Plainfield, N. J.

Odors resulting from digesting sludge can be largely controlled with the use of floating covers. These covers also permit of expansion and contraction of sludge volume, due to barometric changes. Fixed covered tanks fail to provide for such uncontrollable action.

Portland Cement Association's New Manager

The Portland Cement Association, 33 West Grand Avenue, Chicago, Ill., has announced the appointment of James R. Fairman as Manager of its eastern offices, with headquarters at 347 Madison Avenue, New York, succeeding B. H. Wait, who has resigned to take a position as Chief Engineer for Curtis Airports Corporation.

Mr. Fairman joined the field staff of the Association in Kansas City in 1919, where he had been engaged in bridge designing and general engineering work for several years, and in 1923 was appointed District Engineer in charge of the Birmingham, Ala., office. Since December 1, 1925, Mr. Fairman has been manager of the southeastern offices of the Association, with headquarters in Atlanta, Ga., and will continue to supervise Association activities in the Southeast in addition to his new duties in New York.

New Chief Engineer for Paradon

The Paradon Manufacturing Co., Arlington, N. J., has announced the appointment of William H. Fulton as Chief Engineer of the company, to have full charge of the design and development of Paradon chlorinating apparatus and other projects of the company.

A Rotary Snow Shovel for Heavy Trucks

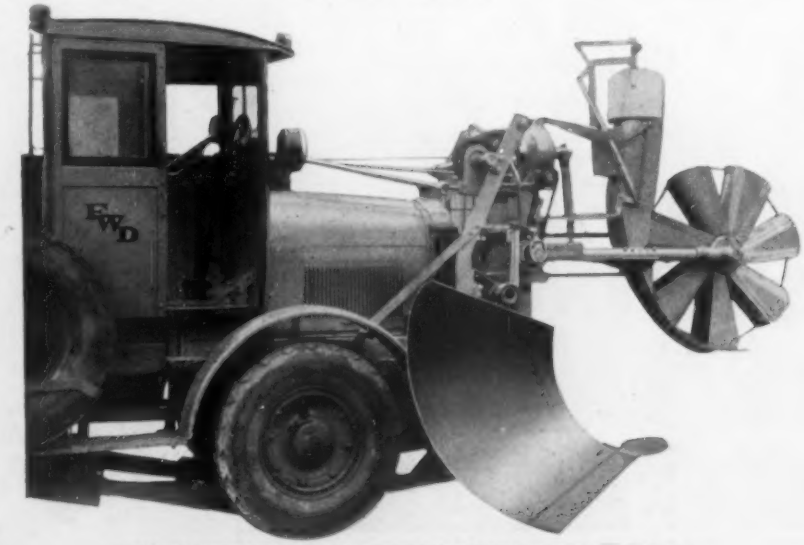
Trucks represent a substantial investment that depreciates rapidly in snow-removal work when used for bucking heavy snowdrifts. The severe strains are usually responsible for breakdowns and delays and expensive service and replacements. To overcome this strain on trucks, the Rightway Corporation, 228 North La Salle Street, Chicago, Ill., has developed the Rightway rotary snow shovel, which consists of a forward-extending and substantially constructed boom equipped at the outer end with a rotor having seven shrouded, trough-shaped shovels which are driven through a transmission by the truck engine. This boom is mounted over the plow and may be swung to either side and raised or lowered to engage the snow. It is mounted in conjunction with a V-type, blade or moldboard plow on the same trucks that are used in general road maintenance work. Thus equipped, the plow alone can remove 80 per cent or more of the snow, and when drifts too deep for the plow are encountered, the Rightway shovel is brought into operation. This shovel will dig its way through any drift at a rate of 10 cubic yards or more per minute. It has a horizontal sweep of 13 feet 6 inches and a vertical lift from the roadbed of 9 feet.

When the roadway has been opened, the Rightway may be used to dispose of the banks formed by the plows. In this work the shovel is swung to either side and set in operation, and the truck is moved continuously forward in the cleared roadway at a speed of 2 miles per hour or faster, removing 25 cubic yards or more per minute.

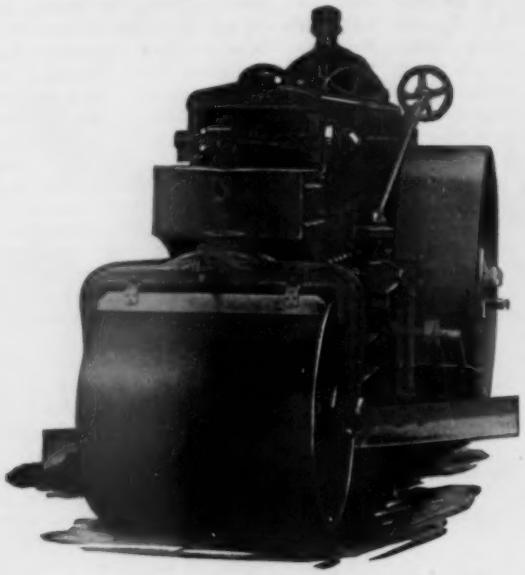
The shovel throws the snow out to a width greater than the plow, so that there is room for snow at both sides into which the plow can roll the body of snow lying next to the road surface. It will handle all kinds of snow without clogging.

The shovel is furnished complete for mounting on the truck frame and can be used on any truck having a rated load capacity of 3 tons or greater. The power required for its operation is taken off the front end of the crankshaft through a double universal joint of conventional type which is furnished with the shovel. An auxiliary power unit is furnished for trucks having inadequate engine power. The swinging boom is driven through multiple disc clutches which are adjusted to slip if ice or other obstructions are encountered, in this way protecting the entire mechanism from undue shocks and stresses.

An important feature of the equipment is the adjustable deflector which automatically maintains its position regardless of the movement of the boom, thus enabling the operator to continually direct the snow.



TRUCK EQUIPPED WITH RIGHTWAY ROTARY SNOW SHOVEL



Leadership

—And All the Term Implies

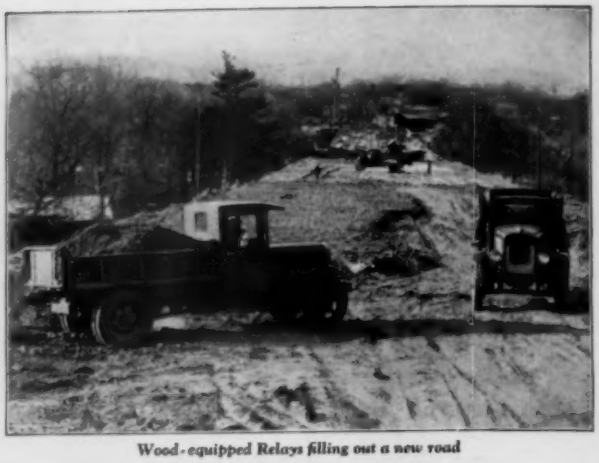
Ability to lead means having those qualities that men recognize as superior. *Nothing else* makes leadership.

From coast to coast, wherever new roads are being made or present ones repaired, Buffalo-Springfield Road Rollers are the choice of the men on the job. Advanced design and superior performance make these rollers widely accepted as leaders worthy of the name.

Various steam and motor driven designs in all practical sizes. Attachments when desired. Interesting booklet on request.

The
Buffalo-Springfield Roller Co.
Springfield, Ohio

BUFFALO—SPRINGFIELD ROAD ROLLERS



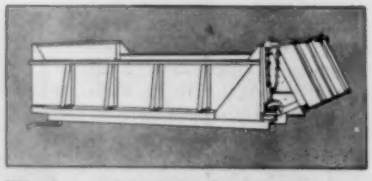
Wood-equipped Relays filling out a new road

WHEREVER ROADS ARE BUILT

dependable Wood hoists and bodies give continuous, unfailing service

ROADBUILDING lays down the stiffest punishment a dump truck ever gets anywhere. Yet roadbuilding demands continuous, unfailing year in and year out performance of the hoist and dump body.

Every Wood hoist and body is engineered and built especially for the work it must do. The complete line includes Underbody Hydraulic Hoists—Vertical Hydraulic Hoists—Mechanical Hoists—Hand-Operated Hoists—Gravity Dumpers—Repair Tower Hoists—Hi-Lift Units—Power Take-Offs and Steel Dump Bodies for every hauling need. Catalogue 10 will gladly be sent upon request.



Wood type W-12 Steel Body is famous for its strength. Fully braced and gusseted for heavy duty service. Comes in standard sizes to fit any chassis. Capacities up to 15 cu. yds.

WOOD HYDRAULIC HOIST & BODY CO.
DETROIT, MICHIGAN

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